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HYDAT CD-ROM

User's Manual

SURFACE WATER AND SEDIMENT DATA
WATER SURVEY OF CANADA
RELEVÉS HYDROLOGIQUES DU CANADA
DONNÉES SUR LES EAUX DE SURFACE ET SUR LES SEDIMENTS

(Current as of April 2, 2001)

ORGANIZATION OF THIS MANUAL

The HYDAT User's Manual is organized as follows:

HYDAT Limited Use Software And Data Product License Agreement

Table of Contents

Chapter 1: "Introduction"

Chapter 2: "Installation"

Guides you through installing the software on your computer.

Chapter 3: "Getting Started"

Presents a summary of how to use the software and important information about the data.

Chapter 4: "Station Selection"

Describes the functions for accessing the data on the CD-ROM.

Chapter 5: "Output Menu"

Explains how to print data or export it in different formats.

Chapter 6: "Windows"

Describes and discusses the contents of the 16 data windows -- Summary, Daily, Extreme, Mean, and the various HYDEX and Sediment windows.

Appendices:

Appendix A: "HYDAT Codes"

Translates flags and codes.

Appendix B: "HYDAT Export Formats"

Supplies technical information on the record structures and named ranges of the HYDAT CD-ROM database export formats.

References

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CHAPTER 1

INTRODUCTION

Water quantity and sediment data collected by Environment Canada are stored in the HYDAT database. The system also contains descriptive information and geographical co-ordinates for all sites, the period-of-operation for each site, and the type of hydrometric data collected in the HYDEX database.

HYDAT contains hydrometric data for over 2900 active stations and some 5100 discontinued sites across Canada. Data on the system include daily and/or instantaneous information for streamflow, water level, suspended sediment concentration, sediment particle size, and sediment load. The data for this information ranges from the year 1850 to the present.

While most of the data in HYDAT came from Departmental survey and monitoring programs, data from provincial, municipal and private agencies are also included. Funding for the collection of the data is provided under cooperative cost-sharing agreements between Environment Canada and each province and territory.

The HYDAT CD-ROM provides rapid access to this huge volume of resource data. The core of the system is its CD-ROM (Compact Digital Read-Only Memory) storage. The HYDAT software interface between this storage and the personal computer was developed by Environment Canada and gives users, at their desks, the power and flexibility to retrieve, view, subset, download, and print selected data from the CD-ROM. The access software is organized to provide, on a province-by-province basis: instantaneous, daily, mean, and extreme values data for the entire period of record for all ten provinces and both territories.

CHAPTER 2

SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES

SYSTEM REQUIREMENTS

COMPUTER

The HYDAT application is designed to run under Windows 3.1, Windows 95, and Windows NT. Being 16-bit code, it conforms to the 8 character file name convention with a 3 character extension. The software has been successfully tested using an IBM/AT compatible 486/25 and a Pentium 133 and has shown acceptable performance with 8 to 32 MB of base memory (RAM). The application is designed to dynamically allocate virtual memory. It can use as little as 64K of memory to as much memory as available by swapping disk space. For more information about virtual memory in Windows 95, select Memory from the Help Menu. Note that there must be 3 MB of hard disk space available for the program to run comfortably. You may then control additional disk space required for storing any temporary data you feel necessary.

MONITOR

The HYDAT CD-ROM system provides a photo display utility. For accurate colour rendition, the display properties must be set to 16-bit colour and Super VGA resolution is recommended.

CD-ROM DRIVE

A CD-ROM drive of any speed is sufficient.

PRINTER

Any serial or parallel dot matrix or laser printer can be used to print text; however, the software was tested on an HP LaserJet III printer. For most dot matrix printers, output sent directly to the printer will be in compressed font in order to fit the paper width. For laser printers, landscape orientation is recommended.

INSTALLATION

To install the software, copy *HYDAT.EXE* (or *FHYDAT.EXE* for the French version) and all the supporting files in the directory HYDAT\English (or HYDAT\Francais) on the HYDAT CD-ROM to a directory you created on your hard disk. Double click the *HYDAT.EXE* or *FHYDAT.EXE* file on your hard disk to initiate the program.

Once the program has started, use the **Utilities|Configuration** menu to set the default CD-ROM drive and Index Root Directory to the appropriate letter designation of your CD drive. Note that you may create a directory for the HYDAT index data (HSIS6) on your hard drive and copy all the information from the CD-ROM; however, you must then make sure to change the Index Root Directory accordingly. This will speed up your application; however, it is only required if you are using a very slow system.

The *HCONF6.CFG* file is provided to store some of the configuration settings and preferences selected by the users and you must make sure that the file is not "Read only". If you are using Windows 95, open Windows Explorer and locate the *HCONF6.CFG* in the directory you created. Select the file using your mouse, choose "Properties" from the **File** menu in the top left corner of the Windows Explorer screen and ensure the 'Read only' attribute box is clear.

RECOMMENDATIONS

Consult your CD-ROM hardware supplier about the maintenance needs of your CD-ROM drive. Some CD-ROM drives need to be serviced and cleaned at regular intervals to avoid problems.

Have as much free RAM as possible when starting HYDAT.

After your new HYDAT application is operational, you may wish to remove the previous one to conserve disk space.

When using smaller screens, the user may want to maximize all open windows before displaying any data to ensure the seven display areas of the report screens are expanded proportionately.

CHAPTER 3

GETTING STARTED

This chapter provides an overview of how to use the HYDAT CD-ROM database. It also covers some important points of general information concerning the database.

USING THE HYDAT CD-ROM

The HYDAT application supplies a series of "windows," or perspectives on the data. Using the HYDAT application usually consists of first selecting a province or territory from the Province window and then selecting from the available stations in those provinces. Next, you display the records for one or more selected stations, using any one of the 16 "data" Report windows: Summary, Daily, Extreme, Mean, and several HYDEX and Sediment windows. You can then export the data you select for further analysis or print out a hard copy.

Starting the HYDAT program brings up the main screen. From here, you can open the "Station Selection" window by selecting a parameter from the **Display** menu or by choosing "Select Station" from the **Utilities** menu. From the main screen you can also list datum, agency, and tributary codes, export data, edit the program configuration, and obtain information from the help files.

In the "Station Selection" window, you can:

- View list of stations by province, drainage basin, and/or parameter.
- Sort stations by ID, name, province, data counts, or dates.
- Select stations for display, data export or printing by double clicking on their names in the index list.
- Search for specific stations using the "Station Lookup" button.

You can also use various buttons in the Station Selection window to save the selected stations to a file in ASCII or binary format, display reports, get stations from a file to replace stations in the Selected Station list, and merge stations from a file with those in the Selected Station list.

When you are finished finding and selecting stations, you can display a report window to see data for the selected stations, print out the information for a report, or export it for additional analysis.

If you are going to work repeatedly with subsets of all the stations in a province, you can save your customized indexes and reload them later, saving considerable time.

USER INTERFACE

The interface for the HYDAT CD-ROM database consists primarily of menus and windows. Menus contain the functions that are available depending on where you are in the interface program.

Menus

Menus are listed in the menu bar along the top of the screen. To display a menu (make it "drop down"), click on the button and you will then see the choices you may make from it. These consist of functions for displaying parameters, selecting stations, exporting and printing, and moving between various years, stations, and parameters. These functions are covered in Chapters 4 through 7.

WINDOW CONTENTS OVERVIEW

Main Screen Window

The Main Screen window (Figure 3-1) is used for first-level decisions on what data to retrieve and is the first screen to appear when you start using the HYDAT application. It contains menus which allow you to save and close files, select stations, display data, configure drives and printers, export data, and obtain program help.

Figure 3-1



Station Selection Window

The Station Selection Window displays a list of all the stations available for the province, and drainage basin, and parameter you select. Each of these fields can be customized in order to help find the station or stations of interest. Once you have isolated a station, double clicking on the entry in the station list box will select the station and add it to the Station Selected List box.

The “Station Lookup” button will bring out the Station Lookup window which allows you to find any stations that meet specific criteria. The Search Area contains a drop down list box and the Search Area options. Here you will be presented with a default Parameter, Search Area, and Sort key which can then be altered to suit the requirements of your search. You may then enter your Filter Criteria and click on the “Search” button to begin. Similar to the Station Selection window, double clicking a station in the station list box will select the station and add it to the Selected Station List box.

Report Windows

The Report windows contain historical information recorded at individual stations across Canada and are different depending upon the selected parameter. All report windows, however, contain detailed identifying information on the station in the window including station name and number, the parameter and units, latitude and longitude, drainage, region, and province or territory. The various Report windows are described below and in more detail in Chapter 6.

Summary Window

The summary window contains results from a series of standard statistical calculations run on the flow or level data for the period of record for each station. These calculations provide a condensed view of the information on that station: monthly summaries of flow or level; mean, maximum, and minimum values for the period of record, statistics of standard deviation and skewness; and so forth. At the bottom of the flow and level summaries is the range of years in which data were collected. A second type of Summary window is provided for sediment load and concentration (see the discussion of Sediment Windows, below).

Daily Window

The daily window displays all of the daily values for each station measuring flow or level, by individual year. Sediment concentration and load are also presented in Daily windows.

Extreme Window

The extreme window lists the extreme flow or level data at a station. The Extreme window presents the maximum instantaneous value, including time, date, and time zone, along with the maximum and minimum daily means. It is arranged by year, earliest first.

Monthly Mean Window

The monthly mean window lists the monthly means of flow or level for each year of the period of record, arranged in rows (years) and columns (months). The annual mean for each year (or standard period within the year, for flow data) is also listed in the far right column.

Sediment Windows

The sediment windows display information from the daily and instantaneous sediment files for each station. These windows include:

- Sediment Summary, presenting combined summary information on sediment load and concentration
- Instantaneous Sediment Depth (Instantaneous Suspended Sediment)
- Instantaneous Sediment Point (Point-Integrating Particle-Size Analysis of Suspended Sediment)
- Instantaneous Bed Material Particle-Size Analysis
- Instantaneous Bed Load Particle-Size Analysis

HYDEX Windows

The HYDEX windows display all the information contained in Environment Canada's HYDEX file for each station. The HYDEX windows are as follows:

- Header
- Operation
- Sediment Record
- Equipment
- Remarks
- Hydrometric Record
- Review

DATA EXPORT

Once you have located the data you want on the HYDAT CD-ROM, you can export it in a variety of formats that allow you to send the data to other programs or spreadsheets. You can export data in Canadian user, comma delimited, blank delimited, Canadian binary, or USGS binary formats; however, available formats may be limited for certain report types. A list of available formats is provided in Chapter 5.

UNITS AND SIGNIFICANT FIGURES

The units and number of digits displayed vary with the parameter:

- Water Discharge - given in cubic metres per second (m^3/s) to three significant figures but not to more than three decimal places
- Water Level - given in metres (m) to two or three decimal places
- Sediment Concentration - given in milligrams per liter (mg/L) to three significant figures, but only as an integer
- Sediment Load - given in tonnes per day (t/d), 1 tonne = 1000 kilograms, to three significant figures but not to more than two decimal places.

In the binary formats, the HYDAT software writes the full floating point number. This number may imply greater precision than the data themselves; in examining such numbers recollect the significant figures discussed above.

EDITING KEYBOARD ENTRIES

While using certain windows, you will be prompted to type information from your keyboard, which you may wish to edit before entering. The editing keys work like most word processors:

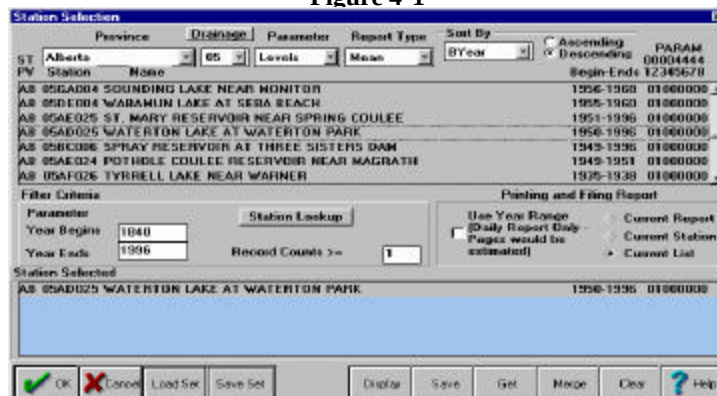
- BACKSPACE erases left of the cursor and, as it moves left, drags the text string which lies to its right along with it.
- DELETE erases under the cursor and then erases to the right of the cursor, one character for each time you press it.
- ENTER accepts what you have typed.

CHAPTER 4

STATION SELECTION

The “Station Selection” window, opened by the **Utilities|Select Station** menu or any of the **Display** menu items, contains all the functions for finding, filtering, and sorting stations as well as creating, saving, and using station indexes or data sets. Figure 4-1 shows the “Station Selection” window for a portion of the Alberta level data.

Figure 4-1



The “Station Selection” window contains several drop down menus which enable you to locate both individual stations and sets of stations in the HYDAT database. Once you have found a station of interest, it may be selected by double clicking on the record which, in turn, adds it to the “Station Selected” region of the window.

SELECTING STATIONS

Province Menu

The **Province** menu lists each of Canada’s 10 provinces and 2 territories by alphabetical order. Selecting any of these menu items produces a list of stations found within the selected area.

Drainage Menu

In most cases, the provincial list is further subdivided by drainage. Clicking on the arrow will list the drainage ID numbers available for the selected province or territory and a full list of all drainage basins is available by clicking on the “Drainage” button above the menu window.

Parameter Menu

The **Parameter** menu contains a list of the 8 measured parameters available on the HYDAT CD-ROM. Once a parameter has been selected from this menu, the station list updates to show only those stations for which observations of the selected parameter are available. Each station in the index window has a corresponding parameters list labeled with a 1 or a 0 under the parameter. The number 1 indicates that there are data available for the corresponding parameter and 0 means there are no data available.

Report Type Menu

The **Report Type** menu contains a list of the 6 HYDAT and 7 HYDEX reports which can be produced from the station data. While these do not influence the list of stations, your selection from this menu determines the output from the “Display” button, export function and print command.

Sort By Menu

The **Sort By** menu can be used to alter the order in which the stations are listed in the index window. The options allow you to sort in ascending or descending order by Station ID, Station Name, Province and Station ID, Province and Station Name, Record Counts, Beginning Year, and Ending Year

Applying Filter Criteria

The **Filter** criteria section enables you to select stations for viewing, exporting, and/or printing based upon specific chosen dates. By selecting a “Year Begins” and “Year Ends” date, you can limit the index window display to those stations which contain a given number of records in the selected time period. This “given number of records” is determined by the user and entered into the “Record counts” window under the “Station Lookup” button. To filter the data, type your chosen dates and record count criteria into their appropriate windows and

click on the index window.

Station Lookup Button

Clicking on the “Station Lookup” Button brings up a window similar to Figure 4-2.

Figure 4-2

The screenshot shows the 'Station Lookup' window with the following components:

- Station List:** A table with columns 'ST', 'PV', 'Station', 'Name', 'Begin-End', and 'Counts'. It lists six stations related to the Muskoka River.
- Parameter:** A dropdown menu set to 'Flow'.
- Search Area:** Radio buttons for 'Country', 'Province', and 'Drainage'.
- Sort By:** A dropdown menu set to 'BYear' with radio buttons for 'Ascending' and 'Descending'.
- Apply Additional Filter Criteria ?** Radio buttons for 'YES' and 'NO'.
- Search By Station:** A dropdown menu set to 'Name'.
- Filter Criteria:** Radio buttons for 'Begins With', 'Contains', and 'Ends With'. The 'Contains' option is selected, and the text 'MUSKOKA' is entered in the adjacent field.
- Search:** A button to execute the search.
- Station Selected:** A section showing the selected station: 'ON 02EB005 MUSKOKA RIVER NEAR BALA' with '1923-1937' and '15'.
- Buttons:** 'OK', 'Cancel', 'Clear', and 'Help' buttons at the bottom.

ST	PV	Station	Name	Begin-End	Counts
ON	02EB008	SOUTH BRANCH MUSKOKA RIVER AT BAYSVILLE		1941-1995	55
ON	02EB007	NORTH BRANCH MUSKOKA RIVER NEAR PORT SYDNEY		1939-1962	24
ON	02EB006	MUSKOKA RIVER BELOW BALA		1937-1995	59
ON	02EB003	SOUTH BRANCH MUSKOKA RIVER AT MATHIAS		1929-1949	21
ON	02EB010	MUSKOKA RIVER AT RAGGED RAPIDS		1923-1967	35
ON	02EB005	MUSKOKA RIVER NEAR BALA		1923-1937	15
ON	02EB004	NORTH BRANCH MUSKOKA RIVER AT PORT SYDNEY		1915-1995	81

The Station Lookup window allows you find specific stations and sort them by using the following filters:

- Parameter: searches for stations measuring the selected parameter
- Country: searches for stations across the entire country
- Province: searches for stations in the specified province*
- Drainage: searches for stations in the specified drainage area
- Station Name: searches for station names which contain, begin with or end in a specified text string
- Station ID: searches for stations by all or part of their identification numbers
- Station Latitude and Longitude: searches for stations found at the specified location
- Year: searches for stations that contain, begin, or end with the specified year
- Range: searches for stations that made any measurements within the specified range of years
- Counts: searches for stations with the specified number of years of data

The Search button will be automatically activated by either the OK button or the Enter key if any of the search criteria have been modified. If the criteria have not been modified, the OK button and the Enter key will take you back to the Station Selection window.

***NOTE: Filters by “Province” are performed on the *PROVINCE OF PUBLICATION* which may not always correspond to the location of the actual station (i.e. US station records are published in the adjacent province).**

When the appropriate station or stations have been found, they can be added to the list of selected stations individually by double clicking on them, or you may save the entire list using the “Save Set” button.

The “Save Set” button allows you save the results of your query to an ASCII index file in the following format:

province id, station id, parameter, number of records, begin year, end-year, region, latitude, longitude,
station name

These sets can then be edited using any ASCII text editor and/or placed directly into a word processing document.

REPORTS

Display Button

Once a station or set of stations have been selected, you can display their data in the report format specified in the “Report Type” menu by clicking on the “Display” button. If the wrong parameter is shown, check to see that the parameter you have selected is available for the selected station(s). More detailed descriptions of the Report windows which result from the Display button are found in Chapter 6.

Printing and Filing Report Menu

The **Printing and Filing Report** menu can be used to restrict the data output to the export and print functions. If the “Current Report” option is checked, only the displayed report will be used. Similarly, if the “Current Station” or “Current List” options are checked, the full range of records for the current station and current list of stations respectively will be used for output.

By choosing the “Use Year Range” option, only information between the “Year Begins” and “Year Ends” dates from the Filter Criteria menu will be available for output.

Note that if the “Use Year Range” option is checked and the specified year range in the “Filter Criteria” includes the station year range, the actual number of records will be shown in the “Pages: From, To” dialog box (i.e. ignores missing records). If the specified year range falls within the station year range and there are missing records during that period, the “Pages: From, To” will only be an estimate and may include a count of years for which there are not data. The print function has been set up to suppress these missing years; therefore, blank pages will not be printed.

WORKING WITH SELECTED STATIONS

If you have created a station index or data set that you might want to use repeatedly, you can save it to a file which can then be recalled to the “Station Selected” window at a later date. The following buttons enable you to save and load indexes in a variety of fashions and formats.

Save Set

Saves the selected stations to an ASCII index file in the following format:

- 7-character station number
- 1 or 2-character parameter code

These sets can then be edited using any ASCII text editor and/or placed directly into a word processing document.

Load Set

Loads ASCII index files created by the “Save Set” command or any ASCII text editor into “Station Selected” window. Note that this function will merge the saved file with any stations already listed in the “Station Selected” window. You can create your own ASCII index files to load in HYDAT; however, you must be sure to use the following format:

- 7-character station number
- 1 or 2-character parameter code

The index file should have a comma between each station number and parameter code pair, with no extraneous blanks, and with each station/parameter pair on a separate line. You should include a carriage return after the last station parameter pair as well.

The parameter code must be defined as follows:

1 = Discharge (Flow)	43 = Inst. Sed. (Bed Load)
2 = Water Level	45 = Inst. Sed. (Depth)
3 = Suspended Sediment Concentration	46 = Inst. Sed. (Point)
4 = Suspended Sediment Load	47 = Inst. Sed. (Bed Material)

Save

Saves the selected stations to a BINARY index file.

Get

Clears the “Station Selected” window and updates it with a list of stations saved in the selected BINARY index file.

Merge

Opens the selected BINARY index file into the “Station Selected” window, adding it to any stations which may have already been selected.

Clear

Clears all stations from the “Station Selected” window.

CHAPTER 5

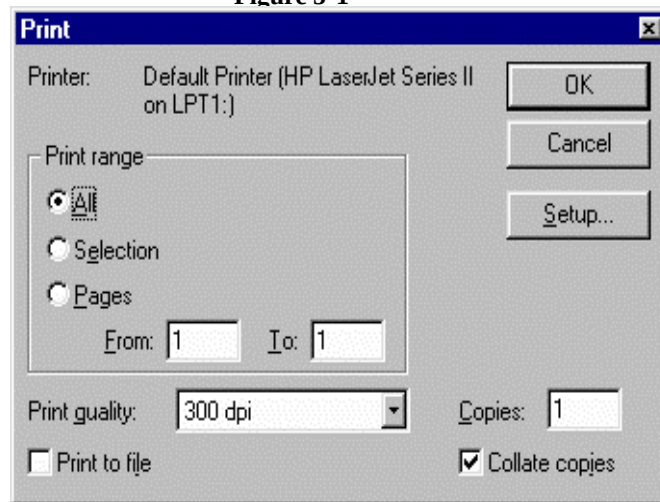
OUTPUT

This chapter outlines how to print or export HYDAT and HYDEX data and gives a brief explanation of what you get when you export the various windows. Technical information on HYDAT export formats is provided in Appendix B.

PRINTING

To print data from a report window currently displayed on your screen, click the printer icon under the main menu bar. This will automatically open the standard Windows Print dialog box shown in Figure 5-1. Access to this dialog box is also available through the Print command under the File menu.

Figure 5-1



The Print dialog box allows you to choose the number of copies, range of pages, and quality for the print job.

The Printing and Filing Report Menu on the Station Selection window can be used to restrict the data output to the export and print functions. If the “Current Report” option is checked, only the displayed report will be printed. Similarly, if the “Current Station” or “Current List” options are checked, the full range of records for the current station and current list of stations respectively will be printed.

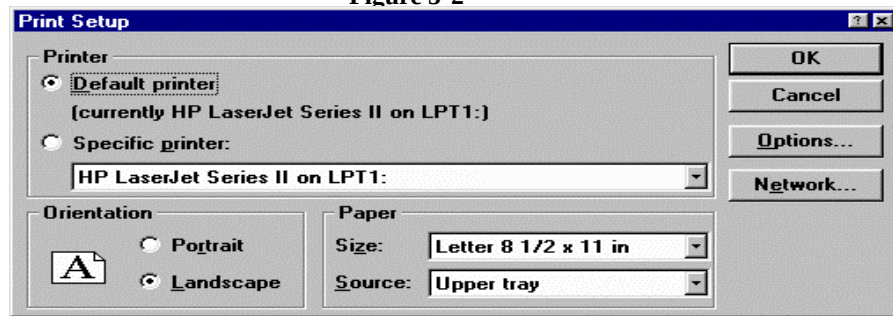
By choosing the “Use Year Range” option, only information between the “Year Begins” and “Year Ends” dates from the Filter Criteria menu will be available for printing.

Note that if the “Use Year Range” option is checked and the specified year range in the “Filter Criteria” includes the station year range, the actual number of records will be shown in the “Pages: From, To” dialog box (i.e. ignores missing records). If the specified year range falls within the station year range and there are missing records during that period, the “Pages: From, To” will only be an estimate and may include a count of years for which there are not data. The print function has been set up to suppress these missing years; therefore, blank pages will not be printed.

You can also customize the printer options by clicking on the Setup button.

By opening the Print Setup dialog box (Figure 5-2), you can choose a specific printer, change the paper orientation, select various paper sizes, and specify the paper source. In most cases, the default landscape orientation on letter size paper provides adequate data output.

Figure 5-2



EXPORTING

The HYDAT export function allows you to save data to your hard drive or a floppy disk in the following formats:

- Canadian user (Card),
- Canadian binary,
- United States Geological Survey (USGS) binary,
- Comma Separated Values, and
- Blank Separated Values

Technical information on HYDAT database export formats is provided in Appendix B; however, the following notes provide a brief explanation of each.

Card

The Canadian User Format is a pre-defined record format (see Appendix B for descriptions).

Comma and Blank Separated Values

The Comma and Blank Separated Values format creates a text file where fields are separated by a special character. Virtually all spreadsheet applications now have file conversion utilities that import this type of delimited file and allow you to customize the layout of the information. By creating such a file and accessing your spreadsheet program, you can perform custom calculations and create graphs from the data readily from within the spreadsheet.

Binary Canada

Canadian binary is one of the two most compressed versions of the data available. This export format is of primary interest to experienced programmers developing models of their own. It does not include any header information and cannot be printed directly since the output is in binary format.

Binary USGS

USGS binary is similar to Canadian binary except that it does not include the flags that qualify some of the data and it does include header information.

Before beginning the export process, it is important to note that **available formats may be limited by the selected report type and/or parameter**. Table 5-1 shows the export formats available for each report type and parameter.

Table 5-1

Report Type	Parameters	Available Formats
• Summary	• flow & levels	• comma & blank separated
• Daily	• flow, levels, conc., load	• all
• Extreme	• flow & levels	• card, comma, blank
	• instantaneous	• card
• Mean	• flow & levels	• card, comma, blank
• Sed. Summary	• conc. & load	• comma, blank
• Ins. Sed.	• depth, point, bedm, bedl	• card
• HYDEX	• Header, Remarks, Operations, Hydrometric, Sediment, Review. & Equipment	• card

To export data from a current Report window, choose the Export function from the top menus and select from the available formats. You can also go straight to the Export window from the Main window. In either case, an Export window will open similar to that shown in Figure 5-3, allowing you to customize the output of your export session.

Figure 5-3

When you choose to export from the Report window, some of the options may already be set (i.e. “Current Format” field should reflect the choice made in the Export menu); however, you are free to change these to suit your requirements. Before exporting, ensure that the Current Province, Report Type, Current Format, and Parameter boxes contain the correct information for the data you require.

Type of Copy

The Type of Copy menu allows you to export data from the current station only, all of the selected stations, or an entire province or territory.

User Defined Copy Period

The Copy period fields are set to the “Station Selection” Filter Criteria values by default but may be edited to suit your preferences. Please note that the User Defined Copy Period must fall within the range of dates indicated in the “Current Station” area below.

Column and Row

If you choose to export data in either of the Comma or Blank Separated formats you are able to choose between the Month and Year *Column* option. If Year column is selected, you have a choice of Julian Day or MMDD *Row* format. In Julian Day, each row is labeled according to Julian day. In MMDD format, the actual month and day will be used to label each row of data. Note that the Julian Day format does not include February 29 in non-leap years.

Once you have customized the export options you are ready to export the data. Click on the export button to begin the process. A warning message will appear, reminding you of the range of data you are about to export and allowing you to cancel the export if you are not satisfied. Choosing "OK" will open a dialog box where you must specify a name and location for the export file.

If you receive an error message stating:

Selected Stations do not have any Selected reports. Please Make new Selection!

return to the export dialog box and ensure that the proper parameter is selected in the Parameter list box and that the User Defined Copy Period falls within the range of data available for the selected station(s).

EXPORT FILE SIZE

An export of 50 years of daily values (Flows, Levels, Concentrations and Loads) produces the following file sizes:

Format	Size
Card	192 Kbytes
Delimited	200 Kbytes
Binary (Canadian)	94 Kbytes
Binary (USGS)	94 Kbytes

An export of 50 years of Flow and Level data produces:

Format / Data Type	Means	Extremes	Summary
Card	8	2	N/A
Delimited	6	3	2

An export of 50 records of instantaneous sediment values (Depth, Point, Bed Material & Bed Load) produces the following file sizes:

Format	Size
Card	7 Kbytes

An export of 50 stations of HYDEX Information produces the following file sizes for the corresponding formats:

HYDEX Data Type	Card
Header	12 Kbytes
Remarks	20 Kbytes
Operations	6 Kbytes
Hydrometric	4 Kbytes
Sediment	9 Kbytes
Review	7 Kbytes
Equipment	4 Kbytes

These proportions hold (roughly) for exports from different reports, but you should note that the file size tally is imprecise and intended only as a relative guide. These values should aid you in determining the number of stations/years that can be successfully stored on a single diskette (3 & 1/2" double-sided high density can store 1.44 Megabytes).

CHAPTER 6

REPORT WINDOWS

The HYDAT retrieval software utilizes 13 report windows to display various Flow, Level, Sediment, and HYDEX data gathered from monitoring stations across Canada and parts of the northern United States. The information in any of these windows can be output to a file or printer using techniques discussed in Chapter 5.

DATA WINDOWS - GENERAL

The top portion of every report window (Figure 6-1) contains the following information:

Figure 6-1

Canadian Hydrological Data (c)1997 Environment Canada	
Station : 05BB001 BOW RIVER AT BANFF Prov-Terr-State : AB	
Latitude:51°10'30"N Longitude:115°34'10"W	
Region : Calgary Drainage Area (km²): 2210(G), 2210(E) Parameter : Flow (m³/s)	

Station

The station's name and ID number. The first two digits in the station number indicate the major drainage basin in which the station is located, the next two characters indicate the sub-basin and sub-sub-basin, and the last three digits identify the station within the sub-sub-basin.

Prov-Terr-State

Two-character code of the province or territory in which the station is located (see Appendix A - "Province Codes" or "State Codes")

Latitude and Longitude

Station location given in degrees, minutes, and seconds.

Region

The name of the regional office responsible for the station.

Drainage Area

Gross drainage area given in square kilometres when available.

Parameter

The type of data collected and its associated units of measurement. HYDAT parameters are as follows:

- Flow (discharge)
- Level (water level)
- Conc (sediment concentration)
- Load (sediment load)
- Depth (depth-integrating particle size analysis of suspended sediment)
- Point (point-integrating particle size analysis of suspended sediment)
- Bed-M (bed material particle size analysis)
- Bed-L (bed load particle size analysis)

Observation Period for Parameter*

The range of years for which any data (no matter how incomplete or patchy) are available.

Hist. Oper. Period**

The historical standard operation period.

* Available for Summary and HYDEX reports only

** Available for HYDEX reports only

The content and layout of the bottom portion of each data window will depend upon two things:

- 1) the parameter (data type) for the station and
- 2) the report selection.

The HYDEX data report windows are available for all parameters, but the other available report windows are as follows:

- Flow: Summary Daily Extreme Mean
- Levels: Summary Daily Extreme Mean
- Conc.: Sed. Summary Daily
- Load: Sed. Summary Daily

Instantaneous Sediment reports are available for each of the particle size parameters (Depth, Point, Bed-M and Bed-L); however, data may not be available for all stations.

The bottom portions of the data windows are described in detail in the following pages under the appropriate report window title.

SUMMARY WINDOW

The Summary report window displays a statistical summary of the data covering the entire period of record for stations measuring flow or level.

The summary statistics are arranged in a row-column format as shown in Figure 6-2. Monthly values are divided into columns, each headed by the name of the month as well as a final column for annual values.

Figure 6-2

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Annual
D Cnt	434	390	434	420	434	420	403	403	398		
D Avg	74.4	68.2	99.1	170	143	78.0	48.2	28.2	29.3		
D Max	193*	156*	251	368*	383*	174	163*	87.5*	162		
D Min	27.3*	31.4	36.8*	22.9	14.3*	14.3*	8.55	10.8	8.83*	9	
H Cnt	14	14	14	14	14	14	13	13	13		
H Std	45.6	37.7	52.5	95.2	80.8	38.3	29.1	17.1	22.7		
H Skw	1.10	0.560	0.380	0.678	0.614	0.478	0.973	1.09	2.30		
H Max	166	120	154	299	256	114	102	61.9	97.0		
H Min	34.7	36.5	41.2	92.5	52.8	34.1	16.9	14.4	13.6		

In some cases, the period of record is too short or there are too many missing data to calculate a valid statistic. In such cases, the HYDAT software displays "----." Valid calculations should still be examined because they may not be statistically significant.

Note:

- The HYDAT convention for valid statistics is that a valid month cannot have any missing daily value and a valid year includes all valid data.
- Level data where a dry observation was recorded were not considered for statistical analysis and, as such, were not included in D Cnt or any of the summary statistics.

The leftmost column is the type of statistic. These are divided into daily statistics (prefaced with a "D") and monthly statistics (prefaced with an "M").

The daily statistics are calculated based on all data that fell within the indicated month during the period of record. For example, D Max in May is the maximum daily value observed in all the months of May within the period of record. The column labeled "Ann." expresses the values derived from all months over the entire period of record.

The daily statistics include:

D Cnt:

The total number of days* for which data were collected in that month during the period of record. D Cnt Ann is the total number of days for which data were collected for the period of record.

D Avg:

The average of all* daily data for the specified month. D Avg for the year is the average of all daily data for the period of record.

D Max:

The maximum daily value observed in that month during the period of record. D Max Ann is the maximum daily value observed for the period of record.

D Min:

The minimum daily value observed in that month during the period of record. D Min Ann is the minimum daily value observed for the period of record.

***Does not include days where dry levels were observed.**

D Max and D Min are the extremes of daily means, not the instantaneous maxima and minima (see Note on the Summaries, below).

The next grouping is the monthly statistics. These statistics are based on the population of means for each month using data for the full period of record and include:

M Cnt:

The number of valid months (months with complete daily data) upon which the period statistics are based. M Cnt for the year is the total number of valid months for the entire period of record.

M Std:

The standard deviation of the monthly means for that month. There is a 66% probability that any month's mean will fall into the range defined by one standard deviation above and below the monthly mean for the period of record.

M Skw:

The coefficient of skewness of the population of monthly means for that month. Measures the departure of the population of monthly means from a normal, symmetrical (Gaussian, or bell-curve) distribution.

Note: Standard deviation and skewness were calculated based on a minimum of three valid observations for a month.

M Max:

The maximum monthly mean for the period of record. M Max for the year is the maximum monthly mean value for the period of record.

M Min:

The minimum monthly mean for the period of record. M Min for the year is the minimum monthly mean value for the period of record.

Note on the Summaries:

You will note many instances where the D Cnt or M Cnt figures vary for a given station (February may have far fewer observations than August). In many such instances, streamflow gauges were not read in winter or dry observations were recorded.

DAILY WINDOW

The Daily Report window presents the readings for a station collecting flow, level, sediment concentration or sediment

load data, on a daily basis, a year's worth at a time. It also presents limited summary statistics for that year's data.

As Figure 6 - 3 illustrates, part of the daily data is hidden when displayed on screen; however, you can move to any desired data using the scroll bars.

Figure 6-3

1972	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
1	00.00	05.26	05.22	04.62	04.49	04.48	04.58	05.07	04.65	
2	00.00	05.42	05.57	04.60	04.47	04.47	04.60	05.04	04.61	
3	00.00	05.54	05.63	04.58	04.46	04.47	04.61	05.03	04.61	
4	00.00	05.66	05.67	04.58	04.45	04.52	04.61	05.01	04.60	
5	00.00	05.76	05.62	04.57	04.46	04.63	04.61	04.98	04.60	
6	00.00	05.85	05.40	04.56	04.45	04.67	04.60	04.92		
7	00.00	06.03	05.37	04.54	04.44	04.69	04.61	04.90		
8	00.00	06.17	05.28	04.52	04.46	04.69	04.73	04.87		
9	00.00	06.23	05.24	04.53	04.45	04.71	04.88	04.86		
10	00.00	06.22	05.16	04.54	04.46	04.71	04.89	04.83		
11	00.00	06.16	05.09	04.54	04.47	04.67	04.91	04.81		
12	00.00	06.09	05.02	04.54	04.47	04.65	04.90	04.80		
13	00.00	06.07	04.97	04.53	04.46	04.62	04.87	04.78		
14	00.00	06.06	04.93	04.52	04.46	04.61	04.86	04.77		
15	00.00	06.23	04.89	04.53	04.46	04.59	04.84	04.74		
16	00.00	06.42	04.85	04.56	04.46	04.58	04.82	04.73		
17	00.00	06.50	04.81	04.60	04.45	04.57	04.84	04.69		
18	00.00	06.50	04.77	04.59	04.45	04.51	04.86	04.69		
19	00.00	06.75	04.69	04.74	04.60	04.48	04.51	04.87		
20	00.00	06.79	04.42	04.72	04.60	04.49	04.54	04.86		
21	00.00	06.85	04.37	04.70	04.57	04.48	04.53	04.84		
22	00.00	06.87	04.28	04.68	04.57	04.48	04.51	04.84		
23	00.00	06.94	04.15	04.65	04.55	04.49	04.51	04.80		
24	00.00	06.97	04.04	04.66	04.54	04.49	04.49	04.79		
25	00.00	05.02	05.83	04.68	04.54	04.50	04.48	04.79		
26	00.00	05.04	05.66	04.68	04.51	04.49	04.48	04.78		
27	00.00	05.05	05.53	04.68	04.51	04.48	04.50	04.77		
28	00.00	05.04	05.37	04.67	04.50	04.49	04.49	04.78		
29	00.00	05.04	05.34	04.65	04.49	04.49	04.48	04.86		
30	00.00	05.00	05.25	04.63	04.49	04.49	04.52	05.03		
Mean		05.93	04.99	04.55	04.47	04.56	04.80	04.77		
Maximum	0*	06.50*	05.67	04.62	04.50	04.71*	05.09	05.07		
Minimum	0*	05.04	04.63	04.49*	04.44	04.47*	04.58	04.59*		

The row of monthly column headings begins with January of the year being examined and ends on the far right side in an annual total column (Ann.). Down the left side of the screen are the days of the month. Below them are summary statistics row headings for that year. Only valid data are used in calculating the statistics.

If there are any missing days in a month, no statistics are calculated on the month and any missing days in the year (standard period) then no statistics for the year. However, an extreme value (min/max), for flows and levels only, is displayed for the year (standard period) only if it is valid. The validity of this value is determined by the responsible regional office.

The summary statistics are as follows:

Mean:

The average of the daily data for a month.

Maximum:

The maximum daily value observed on any day in that month. The values reported are daily means, the result of observation techniques which tend to smooth the instantaneous pulses that take place in the course of the 24 hours.

Minimum:

The minimum daily value observed on any day in that month. The values reported are daily means, the result of observation techniques which tend to smooth the instantaneous pulses that take place in the course of the 24 hours.

Dam 3:

For flow stations only, the total of the daily discharges in cubic decametres is computed for each month that has complete data. The annual total for the year (standard period) in cubic decametres is also computed for complete 'years'.

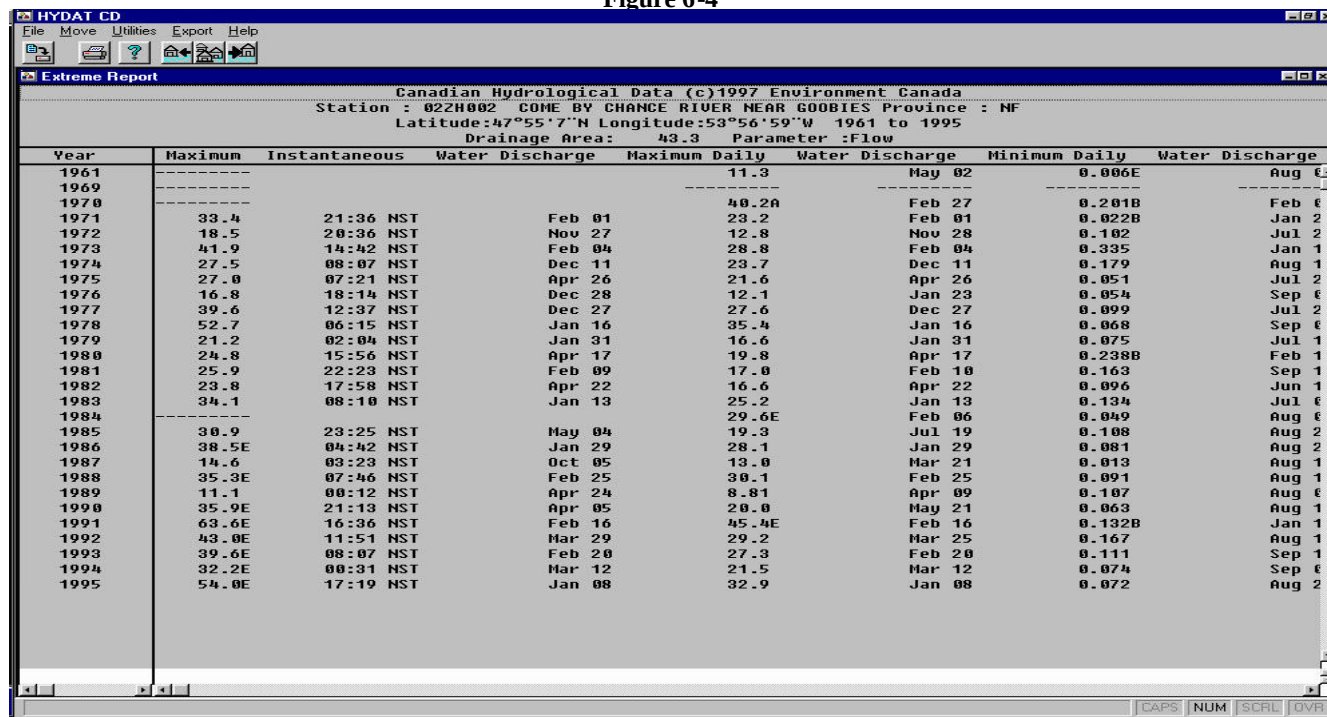
Note: Some data are accompanied by a one-letter flag which indicate specific observation conditions as defined along the bottom

of the window.

EXTREME WINDOW

The Extreme Report window (Figure 6-4) displays the annual maximum and minimum Flows or Levels for a station. The display is arranged chronologically and contains the following information:

Figure 6-4



Canadian Hydrological Data (c)1997 Environment Canada
Station : 022H002 CONE BY CHANCE RIVER NEAR GOOBIES Province : NF
Latitude:47°55'7"N Longitude:53°56'59"W 1961 to 1995
Drainage Area: 43.3 Parameter :Flow

Year	Maximum	Instantaneous	Water Discharge	Maximum Daily	Water Discharge	Minimum Daily	Water Discharge
1961				11.3			
1969						0.006E	
1970							
1971	33.4	21:36 NST	Feb 01	23.2	Feb 01	0.022B	Jan 2
1972	18.5	20:36 NST	Nov 27	12.8	Nov 28	0.102	Jul 2
1973	41.9	14:42 NST	Feb 04	28.8	Feb 04	0.335	Jan 1
1974	27.5	08:07 NST	Dec 11	23.7	Dec 11	0.179	Aug 1
1975	27.0	07:21 NST	Apr 26	21.6	Apr 26	0.051	Jul 2
1976	16.8	18:14 NST	Dec 28	12.1	Jan 23	0.054	Sep 0
1977	39.6	12:37 NST	Dec 27	27.6	Dec 27	0.099	Jul 2
1978	52.7	06:15 NST	Jan 16	35.4	Jan 16	0.068	Sep 0
1979	21.2	02:04 NST	Jan 31	16.6	Jan 31	0.075	Jul 1
1980	24.8	15:56 NST	Apr 17	19.8	Apr 17	0.238B	Feb 1
1981	25.9	22:23 NST	Feb 09	17.0	Feb 10	0.163	Sep 1
1982	23.8	17:58 NST	Apr 22	16.6	Apr 22	0.096	Jun 1
1983	34.1	08:10 NST	Jan 13	25.2	Jan 13	0.134	Jul 0
1984				29.6E	Feb 06	0.049	Aug 0
1985	30.9	23:25 NST	May 04	19.3	Jul 19	0.108	Aug 2
1986	38.5E	04:42 NST	Jan 29	28.1	Jan 29	0.081	Aug 2
1987	14.6	09:23 NST	Oct 05	13.0	Mar 21	0.013	Aug 1
1988	35.3E	07:46 NST	Feb 25	30.1	Feb 25	0.091	Aug 1
1989	11.1	00:12 NST	Apr 24	8.81	Apr 09	0.107	Aug 0
1990	35.9E	21:13 NST	Apr 05	20.0	May 21	0.063	Aug 1
1991	63.6E	16:36 NST	Feb 16	45.4E	Feb 16	0.132B	Jan 1
1992	43.0E	11:51 NST	Mar 29	29.2	Mar 25	0.167	Aug 1
1993	39.6E	08:07 NST	Feb 20	27.3	Feb 20	0.111	Sep 1
1994	32.2E	00:31 NST	Mar 12	21.5	Mar 12	0.074	Sep 0
1995	54.0E	17:19 NST	Jan 08	32.9	Jan 08	0.072	Aug 2

Year:

The year for which the data are displayed.

Max Instantaneous Discharge/Level:

The instantaneous extreme data recorded in that year. The flags are the same as daily mean values and an asterisk signifies the extreme for the period of record. Flow values have three significant digits; level values have two or three digits to the right of the decimal. The following information is also provided under the Max Instantaneous Discharge or Level:

- Time: 2400-hour format
- Zone: 3-character abbreviation of the time zone
(see Appendix A - "Time Zone Codes")
- Month and Day

Maximum Daily Discharge/Level:

The maximum daily mean recorded for that year (standard period) and the date on which it occurred. The maximum daily is displayed only if it has been determined to be valid for the year or standard period.

Minimum Daily Discharge/Level:

The minimum daily mean recorded for that year (standard period) and the date on which it occurred. The minimum daily is displayed only if it has been determined to be valid for the year or standard period.

MONTHLY MEAN WINDOW

The Monthly Mean Report window (Figure 6-5) provides the monthly mean flows/levels by year in a row-column format. The monthly mean is the arithmetic mean of all the daily values during a particular month. It is only computed if the daily values for the month are complete.

Figure 6-5

Canadian Hydrological Data (c)1997 Environment Canada
 Station : 00F0801 PORCUPINE RIVER AT OLD CROW Province : YT
 Latitude:67°33'56"N Longitude:139°53'0"W 1961 to 1995
 Drainage Area: 55400 Parameter :Flow (m³/s)

Year	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Ann.
1965					1560	852	844	837			
1966					1140	316	52.6	150			
1967											
1968					1650	316	184	184	41.2	33.9	
1969	15.0	13.6	14.8	458	440	167	869	392	60.8	34.1	
1970	14.6	15.7	16.6	669	1070	488	412	447	85.8	47.4	
1971	17.4	16.2	13.9	1610	1000	337	649	515	123	39.4	
1972	20.2	17.9	14.2	474	1840	536	538	630	113	49.4	
1973	21.0	16.5	15.6	1860	1170	663	1008	556	161	46.3	
1974	15.4	15.0	14.8	459	539	506	1020	381	220	87.0	
1975	16.0	12.4	11.9	1330	1450	256	362	405	115	34.4	
1976	16.5	14.7	14.7	1520	1190	337	587	231	164	54.6	
1977	23.6	22.0	19.8	1350	1940	309	127	186	172	51.8	
1978	19.2	17.3	16.7	32.6	1540	443	176	330	176	68.8	
1979	13.2	14.5	15.5	1170	697	524	577	506	233	90.9	
1980	20.3	17.7	19.0	1340	963	281	866	585	184	64.7	
1981	27.5	24.1	22.0	1550					110	52.1	
1982	13.7	12.9	12.9	582				376	161	46.7	
1983	16.4	15.6	15.7	91.8	1200	211	158	235	96.1	43.7	
1984	15.5	14.4	15.8	1300	979	967	889	320	67.1	31.8	
1985	21.2	19.2	17.4	727	891	292	169	451	172	46.4	
1986	22.3	18.0	16.3	18.3	698	313	558	406	107	42.2	
1987	19.5	17.0	14.7	456	681	150	598	473	100	42.0	
1988	17.6	17.7	20.4	1160	781	311	534	541	92.8	34.2	
1989	17.4	16.5	17.5	1040	1340	404	300	375	105	46.9	
1990	14.3	12.0	19.7	1540	700	185	310	377	95.1	40.0	
1991	20.0	17.9	16.9	1130	600	161	963	334	157	39.0	
1992	16.0	19.4	20.4	909	2120	262	345	231	73.5	41.0	
1993	14.9	14.8	19.0	1020	850	304	331	635	99.7	54.1	
1994	21.7	18.4	19.8	1560	1150	806	298	443	99.8	49.4	
1995	17.4	15.1	41.2	1760	1140	706	601	917	217	60.4	
Mean	18.5	16.0	18.0	1020	1190	464	556	439	129	47.6	
Maximum	20.3	24.1	41.2	2140	2470	1870	1090	917	233	90.9	
Minimum	13.2	12.4	11.9	18.3	440	150	53.6	104	41.2	24.5	

Year:

The year for which the data are displayed.

Mean:

Below the header, the window contains the monthly mean values for each year (row). An “annual” mean is presented in the “Ann.” column on the far right and is only computed if monthly means are available for all months within the year or standard period. The mean monthly mean for each month is given at the bottom of the monthly column and there is a flag to indicate data that have been revised recently. The mean value at the bottom of the “Ann.” column is calculated from those values which appear in the “Ann.” column.

Maximum:

The maximum monthly mean for each month is given at the bottom of the monthly column. The “Ann.” maximum is taken from the values in the “Ann.” column.

Minimum:

The minimum monthly mean for each month is given at the bottom of the monthly column. The “Ann.” minimum is taken from the values in the “Ann.” column.

SEDIMENT SUMMARY WINDOW

The Sediment Summary Report window (Figure 6-6), for sediment load and concentration, includes historical and statistical analyses of the suspended sediment for a given station. The report contains the following information:

Figure 6-6

HYDAT CD									
File View Layout Export Help									
Sediment Summary Report									
Canadian Hydrological Data (c)1997 Environment Canada									
Station : 01NP004 WENNEBEGAN RIVER AT NP00401 Prov-Terr-State : NB									
Latitude:45°42'7"N Longitude:65°36'5"W									
Region : Dartmouth Drainage Area : 1500 (km²) Parameter : Conc									
Year	Type of Sampling	Sampled Concentration		Suspended Sediment Load		Summary		Historic	
		Maximum (MG/L)	Minimum (MG/L)	Maximum (TONNES)	Sediment Load Period Total (TONNES)	Mean Load (TONNES)	Period Total (TONNES)		
1966	MANUAL	90	Nov 04	1	Aug 29	185	Nov 04	1470	
1967	MANUAL	195	Nov 24	0*	Feb 21	1400	Nov 24	85.1	85.1
1968	MANUAL	457	Feb 04	1	Oct 09	2150	Feb 04	77.9	78.8
1969	MANUAL	215	Jan 19	2	Jun 16	2340	Dec 23	69.8	53.4
1970	MANUAL	351	Feb 04	2	May 11	11200	Feb 04	81.1	195
1971	MANUAL	355	Nov 26	1	Oct 23	1800	Apr 15	88.4	77.6
1972	MANUAL	441	Oct 09	1	Feb 06	5480	May 04	86.9	128
1973	MANUAL	408	Mar 12	1	Mar 04	3820	Apr 23	88.8	94.2
1974	MANUAL	463	Sep 30	1	Jun 05	10100	Dec 18	92.8	127
1975	MANUAL	220	Dec 27	3	Mar 10	3040	Nov 14	98.1	68.4
1976	MANUAL	189	Jan 28	3	Aug 24	4390	Jan 28	98.6	95.1
1977	MANUAL	249	Oct 09	4	Jan 27	3370	Dec 28	93.8	125
1978	MANUAL	137	Apr 20	2	Sep 06	1910	Apr 21	91.3	64.6
1979	MANUAL	427	Apr 10	1	Sep 04	7450	Jan 03	97.5	171
1980	MANUAL	232	Apr 05	1	Feb 02	1930	Apr 05	94.3	53.5
1981	MANUAL	814*	Oct 06	1	Jul 26	11500*	Feb 12	101	198*
1982	MANUAL	200	Apr 01	2	May 29	2160	Apr 01	98.4	64.9
1983	MANUAL	144	Dec 14	2	Feb 26	2200	Dec 14	96.6	67.7
1984	MANUAL	419	Apr 06	1	Nov 10	3910	Apr 06	97.9	159
1985	MANUAL	162	Apr 07	1	Jan 01	1480	Apr 07	94.8	39.1
1986	MANUAL	318	Apr 09	1	Feb 12	3140	Mar 21	94.5	88.8
1987	MANUAL	93	Apr 01	1	Jan 06	1770	Apr 01	92.6	53.6
1988	MANUAL	131	Apr 17	2	May 24	816	Mar 30	10900	

Period-of-Operation Summary:

Contains one of the following codes for each month of the year, under it's corresponding column:

- "-" for no data for the month
- "P" for an incomplete month; at least one day of data is missing (i.e. enter "P" if you have 1 to 30 days of data for May)
- "C" for a complete month of data

Type of Sampling:

Contains the type of sampling method used to collect the sediment samples during the period of operation. If the samples were collected by manual methods then the column would indicate "MANUAL". If the samples were collected by a pump sampler or other automatic methods then the column would indicated "AUTO". If both manual and automatic methods were used then the column would indicated "BOTH".

Sampled Concentration

Maximum:

Obtained by finding the maximum daily concentration value, for the year, on days where sample(s) were collected. The extreme recorded for the period of record is indicated by an asterisk (*). This value is displayed as long as there is at least one complete month.

Minimum:

Obtained by finding the minimum daily concentration value, for the year, on days where sample(s) were collected. The extreme for the period of record is indicated by an asterisk (*) and is displayed if there is at least one complete month.

Suspended Sediment Load Maximum Daily:

Obtained by finding the maximum daily Load value for the year. The extreme recorded for the period of record is indicated by an asterisk (*). This value is displayed as long as there is at least one complete month.

Suspended Sediment Load Total for Period:

Obtained by adding all daily values available. This value is then rounded as follows:

- | | |
|-------------------------|---|
| • less than 0.004 | show "0" for this field |
| • between 0.005 & 9.994 | round to 2 decimal places |
| • between 9.995 & 99.94 | round to 1 decimal places |
| • greater than 99.95 | round to 3 significant figures and show as an integer |

The extreme recorded for the period of record is indicated by an asterisk (*). This value is displayed as long as there is at

least one complete month.

Summary Period-of-Record:

Obtained from HYDEX. This period is known as the Standard Period for the station (e.g. "SUMMARY : MAR-OCT"). It is used for validating the following three columns and is defined by the responsible Regional Office.

Mean Load:

Obtained by adding all the daily loads for the Standard Period and dividing it by the number of days in the Standard Period (e.g. March to October is 245 days). This value is then rounded the same as mentioned in Suspended Sediment Load Total for Period.

Historical Mean Load:

Obtained by adding the previous un-rounded mean loads and dividing by the number of years. This value is then rounded the same as mentioned in Suspended Sediment Load Total for Period.

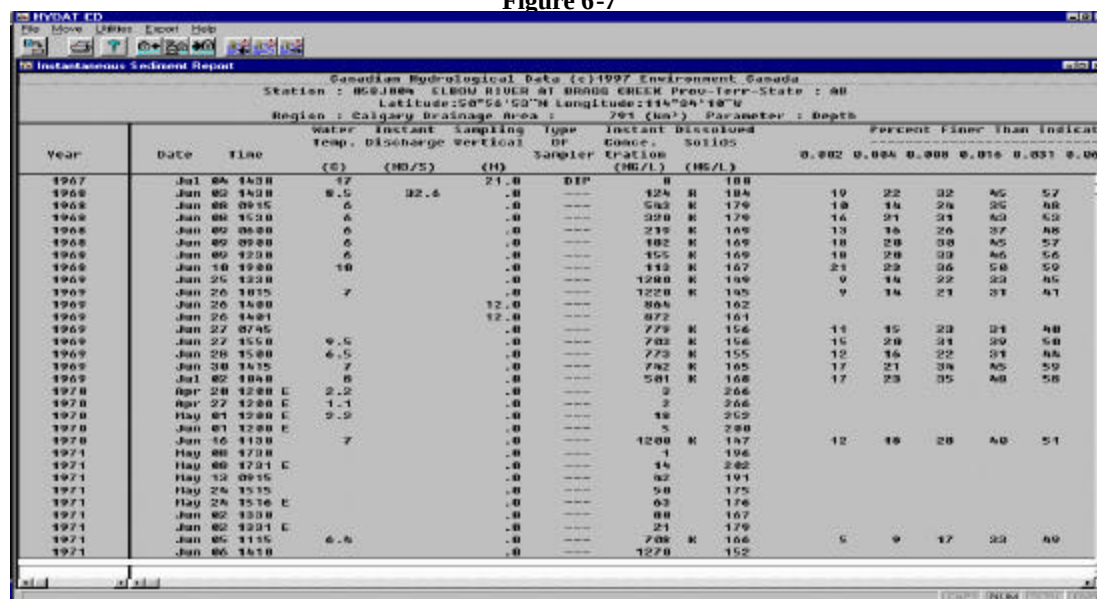
Standard Error of Mean %:

Obtained by getting the Standard deviation, dividing it by (the un-rounded mean multiplied by the square root of the number of years). Then this value is multiplied by 100 to put it in percent. This value is then shown to the nearest tenth of a percent.

INSTANTANEOUS SEDIMENT DEPTH WINDOW

The Instantaneous Sediment Depth Report window (Figure 6-7) contains all sediment depth integration data for a given station.

Figure 6-7



Year	Date	Time	Water Temp. (C)	Instant Discharge (M/S)	Sampling Vertical (H)	Type	Instant Dissolved Solids (MG/L)	Percent Finer Than
1967	Jul 04	1430	17	21.0	DIP	0	100	
1968	Jan 02	1430	8.5	32.6	0	124	104	19 22 32 45 57
1968	Jan 08	0915	6	0	0	583	179	10 14 24 35 48
1968	Jan 08	1530	6	0	0	330	179	14 21 31 43 53
1968	Jan 09	0800	6	0	0	239	169	13 16 26 37 48
1968	Jan 09	0900	6	0	0	182	169	18 20 30 45 57
1968	Jan 09	1230	6	0	0	155	169	18 20 30 45 57
1968	Jan 10	1900	10	0	0	113	167	21 23 36 50 59
1969	Jan 25	1230	0	0	0	1200	169	9 14 22 33 45
1969	Jan 26	1035	7	0	0	1220	165	9 14 21 31 41
1969	Jan 26	1400	12.0	0	0	885	162	
1969	Jan 26	1401	12.0	0	0	972	161	
1969	Jan 27	0745	0	0	0	779	156	11 15 23 31 40
1969	Jan 27	1550	9.5	0	0	702	156	15 20 31 39 50
1969	Jan 28	1500	6.5	0	0	773	155	12 16 22 31 44
1969	Jan 30	1435	7	0	0	782	165	17 21 34 45 59
1969	Jul 02	1040	8	0	0	501	168	
1970	Apr 20	1200 E	2.2	0	0	2	266	
1970	Apr 27	1200 E	1.1	0	0	2	266	
1970	May 01	1200 E	2.2	0	0	88	255	
1970	Jun 16	1130	7	0	0	5	280	
1970	Jun 16	1130	7	0	0	1200	167	12 16 20 40 51
1971	May 08	1730	0	0	0	1	196	
1971	May 08	1731 E	0	0	0	14	282	
1971	May 12	0915	0	0	0	62	191	
1971	May 24	1535	0	0	0	50	175	
1971	May 24	1536 E	0	0	0	63	176	
1971	Jun 02	1330	0	0	0	88	167	
1971	Jun 02	1331 E	0	0	0	21	179	
1971	Jun 05	1135	6.6	0	0	708	166	5 9 17 23 49
1971	Jun 06	1430	0	0	0	1220	152	

The screen contains several columns including:

Year, Date and Time:

Contain the time to the nearest minute of when the sample was taken. The "Time" column may include an "E" symbol which means the time is an estimate only.

Water Temperature:

Contains the instantaneous water temperature in Celsius at the time the sample was taken.

Instant. Discharge:

Contains the instantaneous discharge in cubic metres per second at the time the sample was taken. This column may contain symbols explained in Appendix A - "Daily and Extreme Codes".

Sampling Vertical:

May contain numbers or codes. If numbers, it indicates the distance, in metres, from an initial point to the sampling vertical. If it contains codes, then these codes are explained in Appendix A - "Sediment Vertical Type Codes". There may also be a symbol related to this field and these symbols are explained in Appendix A -

"Sediment Vertical Symbol Codes".

Instant. Concentration:

Contains the instantaneous concentration sampled in milligrams per litre. This column may contain symbols explained in Appendix A - "Sediment Concentration Codes".

Dissolved Solids:

Contains the instantaneous dissolved solids sampled in milligrams per litre.

Percent Finer Than Indicated Size, in Millimetres:

Contains the percentage values for indicated particle sizes for samples collected.

Percent Sand:

Obtained by subtracting the value displayed for particle size 0.062 mm from 100.

Percent Silt:

Obtained by subtracting the value displayed for particle size 0.004 mm from the value displayed for particle size 0.062 mm.

Percent Clay:

Obtained by using the value displayed for particle size 0.004 mm.

INSTANTANEOUS SEDIMENT POINT WINDOW

The Instantaneous Sediment Point Report window (Figure 6-8) contains all sediment point integration data for a given station.

Figure 6-8

Year	To	Time	Water Temp. (C)	Panel Discharge (M3/S)	Sampling Depth Vertical (M)	Instant of Sample (H)	Dissolved Solids (MG/L)	Percent Finer Than Indicated Size (MG/L)
			(C)	(M3/S)	(M)	(H)	(MG/L)	0.002 0.004 0.006 0.016 0.031 0.062 0.125
1955	Jun 10	1201 E	609	79.6	1.71	365		13 28 49
1955	Jun 10	1202 E	609	79.6	1.95	580		22 31 40 50 58
1955	Jun 10	1203 E	609	79.6	2.1	378		4 11
1955	Jun 10	1204 E	609	79.6	2.19	368		10 18 32
1955	Jun 10	1205 E	609	79.6	2.32	325		12 18
1955	Jun 10	1206 E	609	79.6	2.38	385		2 6
1955	Jun 10	1207 E	609	79.6	2.44			
1955	Jun 10	1208 E	609	152	.15	318		67 78
1955	Jun 10	1209 E	609	152	.82	320		4 30 56 68
1955	Jun 10	1210 E	609	152	1.37	365		37 57 64 68 75
1955	Jun 10	1211 E	609	152	1.62	405		32 52 74 78 81
1955	Jun 10	1212 E	609	152	1.89	720		42 55 57 58 68
1955	Jun 10	1213 E	609	152	2.16	710		13 23 26 42 50
1955	Jun 10	1214 E	609	152	2.32	640		12 17 21 28 38
1955	Jun 10	1215 E	609	152	2.44	920		16 20 24 28 34
1955	Jun 10	1216 E	609	152	2.59	950	1	2 3 13 16 35
1955	Jun 10	1217 E	609	152	2.65	975		3 10 22 32
1955	Jun 10	1218 E	609	152	2.71			
1955	Jun 10	1219 E	609	233	.7	450		48 58 62 72 74
1955	Jun 10	1220 E	609	233	.82	470		35 48 58 73 77
1955	Jun 10	1221 E	609	233	1.16	595		25 30 38 41 45
1955	Jun 10	1222 E	609	233	1.22	485		13 24 34 40 48
1955	Jun 10	1223 E	609	233	1.28	750		30 32 36 39 45
1955	Jun 10	1224 E	609	233	1.31	795		19 20 22 28 35
1955	Jun 10	1225 E	609	233	1.37			

The screen contains several columns including:

Year, Date and Time:

Contain the time to the nearest minute of when the sample was taken. The "Time" column may include an "E" symbol which means the time is an estimate only.

Water Temperature:

Contains the instantaneous water temperature in Celsius at the time the sample was taken.

Panel Discharge:

Contains the instantaneous discharge in cubic metres per second for the panel at the time the sample was taken. This column may contain symbols explained in Appendix A - "Daily and Extreme Codes".

Sampling Vertical:

May contain numbers or codes. If numbers, it indicates the distance, in metres, from an initial point to the sampling vertical. If it contains codes, then these codes are explained in Appendix A - "Sediment Vertical Type Codes". There may also be a symbol related to this field and these symbols are explained in Appendix A - "Sediment Vertical Symbol Codes".

Depth of Sample:

Contains the water depth in metres where the sample was taken.

Instantaneous Concentration:

Contains the instantaneous concentration sampled in milligrams per litre. This column may contain symbols explained in Appendix A - "Sediment Concentration Codes".

Dissolved Solids:

Contains the instantaneous dissolved solids sampled in milligrams per litre.

Percent Finer Than Indicated Size, in Millimetres:

Contains the percentage values for indicated particle sizes for samples collected.

Percent Sand:

Obtained by subtracting the value displayed for particle size 0.062 mm from 100.

Percent Silt:

Obtained by subtracting the value displayed for particle size 0.004 mm from the value displayed for particle size 0.062 mm.

Percent Clay:

Obtained by using the value displayed for particle size 0.004 mm.

INSTANTANEOUS SEDIMENT BED MATERIAL WINDOW

The Instantaneous Sediment Bed Material Report window (Figure 6-9) contains all sediment bed material data for a given station.

Figure 6-9

Year	Date	Time	Panel Discharge (m³/s)	Sampling Vertical (m)	Type of Sampler	Instantaneous Discharge (m³/s)	Percent Finer Than Indicated Size
							0.004 0.006 0.014 0.031 0.062 0.125 0.250 0.500 1.0
1964	Apr 15	1100	.750		LAKE		40 52 68 76 86
1964	Jul 20	1115	.000		LAKE		31 34 36 41 44
1965	Apr 16	1545	.688		LAKE		26 30 34 44 54
1967	May 06	1430	1.21		SCBOP		30 34 40
1968	Jul 03	1345	.79		SCBOP		7 18 19
1969	Apr 29	1445	.04		SCBOP		3 6 11

The screen contains several columns including:

Year, Date and Time:

Contain the time to the nearest minute of when the sample was taken. The "Time" column may include an "E" symbol which means the time is an estimate only.

Panel Discharge:

Contains the instantaneous discharge in cubic metres per second for the panel at the time the sample was taken. This column may contain symbols explained in Appendix A - "Daily and Extreme Codes".

Sampling Vertical:

May contain numbers or codes. If numbers it indicates the distance, in metres, from an initial point to the sampling vertical. If it contains codes, then these codes are explained in Appendix A - "Sediment Vertical Type Codes". There may also be a symbol related to this field and these symbols are explained in Appendix A - "Sediment Vertical Symbol Codes".

Type of Sampler:

Contains the type of measurement device used to take the sample.

Percent Finer Than Indicated Size, in Millimetres:

Contains the percentage values for indicated particle sizes for samples collected.

INSTANTANEOUS SEDIMENT BED LOAD WINDOW

The Instantaneous Sediment Bed Load Report window (Figure 6-10) contains all sediment bed load data for a given station.

Figure 6-10

Canadian Hydrological Data (c)1997 Environment Canada									
Station : 08H0818 PHASES RIVER NEAR MARGUERITE PROV-TERR-STATE : BC									
Latitude: 52°31'48"N Longitude: 122°26'32"W									
Region : Vancouver Drainage Area : 114000 (km²) Parameter : BedL									
Year	Date	Time	Instant Discharge (m³/s)	Sampling Vertical (m)	Type	Sampler	Instant Concentration (mg/L)	Dissolved Solids (mg/L)	Percent Finer
1973	Jun 25	0515					ARR		
1973	Jul 17	0615					ARR		
1973	Jul 17	0510					ARR		
1973	Aug 22	0615					ARR		
1973	Oct 11	0500					ARR		
1974	Apr 24	0525					ARR		
1974	Apr 24	0615					ARR		
1974	Aug 15	0610					ARR		
1974	Aug 15	0620					ARR		
1974	Aug 15	0515					ARR		
1974	Jun 10	0400					ARR		
1974	Jun 10	0450					ARR		
1974	Jul 04	0405					ARR		
1974	Jul 04	0500					ARR		
1974	Aug 16	0620					ARR		
1975	Jun 12	0615					ARR		
1975	Jun 26	0450					ARR		
1975	Jun 26	0545					ARR		
1975	Jul 17	0450					ARR		
1976	Apr 28	1852	2330				ARR		
1976	Aug 26	1850	3710				ARR		
1976	Jun 16	1820	4200				ARR		
1976	Aug 10	1855	4050				ARR		
1977	Aug 05	1852	3600				ARR		
1977	Jun 15	1918	3170				ARR		
1977	Jun 23	1905	3910				ARR		
1977	Aug 11	2046	2230				ARR		
1978	Apr 27	2210					ARR		
1978	Jun 08	2050	3200				ARR		
1978	Jun 29	2050	2140				ARR		
1979	Jun 21	2135	3570				ARR		

The screen contains several columns including:

Year, Date and Time:

Contain the time to the nearest minute of when the sample was taken. The "Time" column may contain an "E" symbol which means the time is an estimate only.

Instantaneous Discharge:

Contains the instantaneous discharge in cubic metres per second at the time the sample was taken. This column may contain symbols explained in Appendix A - "Daily and Extreme Codes".

Sampling Vertical:

May contain numbers or codes. If numbers, it indicates the distance, in metres, from an initial point to the sampling vertical. If it contains codes, then these codes are explained in Appendix A - "Sediment Vertical Type Codes". There may also be a symbol related to this field and these symbols are explained in Appendix A - "Sediment Vertical Symbol Codes".

Type of Sampler:

Contains the type of measurement device used to take the sample.

Instantaneous Concentration:

Contains the instantaneous concentration sampled in milligrams per litre. This column may contain symbols explained in Appendix A - "Sediment Concentration Codes".

Dissolved Solids:

Contains the instantaneous dissolved solids sampled in milligrams per litre.

Percent Finer Than Indicated Size, in Millimetres:

Contains the percentage values for indicated particle sizes for samples collected.

HYDEX WINDOWS - GENERAL

The top portion of each of the seven HYDEX windows (Header, Remarks, Operation, Hydrometric Records, Sediment Records, Review and Equipment) contains station information as follows:

Station (No.):

A seven-character station number assigned by Environment Canada. The first two digits indicate the major drainage basin in which the station is located. The next two characters indicate the sub-basin and sub-sub-basin. The last three digits identify the station within the sub-sub-basin.

Station (Name):

This is the official name of the gauging station including the body of water on which the station is located and an approximate location, i.e., "at Highway No.47". (Max. 70 characters).

Prov./Terr./State:

A two-character identification for the province, territory or state in which the station is located. (See Appendix A - "Province Codes", "State Codes").

Latitude, Longitude:

Given in degrees, minutes and seconds. This refers specifically to the location of the gauge. An exception is for streams draining lakes or reservoirs. In these cases, the location of the outlet of the lake or reservoir is given.

Region:

The name of the regional office responsible for the station.

Drainage Area:

The gross drainage area of a stream at a specified location. Defined as that plane area, enclosed by its drainage divide, which might be expected to entirely contribute runoff to a specified location under extremely wet conditions. The drainage area for water level stations on lakes or reservoirs shows the area to the outlet, rounded to three significant figures but including no more than two decimal points.

Parameter

The type of HYDEX report displayed. Parameters are as follows:

- Header
- Operation
- Sediment Records
- Equipment
- Remarks
- Hydrometric Records
- Review

Observation Period for Parameter:

The range of years from first year to last year for which any data (no matter how incomplete or patchy) are available.

Hist. Oper. Period:

The historical standard operation period.

The bottom portion of the seven HYDEX windows are described in detail in the following pages under the appropriate window title.

HYDEX HEADER WINDOW

The HYDEX Header Report window (Figure 6-11) contains the following fields of information:

Figure 6-11

HYDAT CD

File Move Utilities Export Help

Hydex Report

Canadian Hydrological Data (c)1997 Environment Canada

Station : 02EB104 HAWKROCK RIVER AT GRAVENHURST Prov-Terr-State : ON
 Latitude: 44°55'56"N Longitude: 79°21'23"W Observation Period for Station 1969 to 1976
 Region : Guelph Drainage Area : 40.7 (km²) Parameter : Header Hist. Oper. Period : -

ID	Type	Datum	Conver. Factor	Unrelated ID	Period From	Period To
010	1	Local				

Remote Acc. : N Legal Land :
 Sed. Progr. : Sample No. : Vertical Code :

Datum Name
 010 : ASSUMED DATUM

1 - Local Datum
 2 - Official Datum
 3 - Other Datum

Datum / Sediment Program / Sampling Vertical

CAPS NUM SCRL OVR

Datum ID:

A three-character code is given for the gauge datum for water level stations (See Appendix A - "Datum Codes"). The Datum Name corresponding to the Datum ID can be observed by scrolling down to the page on the screen.

Datum Type:

A one-character code which identifies the type of datum for each Datum ID at a station (See Appendix A - "Datum Type Codes"). There is always a "Local" Datum Type to which the water level are referred. Frequently the local datum can be converted to another "Official" or "Other" Datum Type, as described in the following fields.

Datum ID. From:

A three-character code. This would be the Datum ID for the Local Datum Type when converting to an Official or Other Datum Type.

Datum ID. To:

A three-character code. This would be the Datum ID for the Official or Other Datum Type when converting from the Local Datum Type.

Conver. Factor:

A seven-character number from -9999.999 to +9999.999. This is the conversion factor you add from local datum to obtain the official or other datum.

Unrelated Datum ID:

A three-character code (See Appendix A - "Datum Codes"). Generally the water level are all referred to the same local datum for the entire period of record. However there are instances where an early datum was lost when the bench marks were destroyed. In these cases, the water levels for that period cannot be tied-in to the local datum and are referred to this 'Unrelated' datum.

Unrelated Period From:

Date YYYY-MM-DD. The beginning date of an unrelated period.

Unrelated Period To:

Date YYYY-MM-DD. The ending date of an unrelated period.

Remote Acc:

One-character code N-No Y-Yes. A station is considered "remote" if it is not readily accessible by a conventional means such as by car or snowmobile, and requires additional expense such as by aircraft.

Legal Land (Description):

14 characters. The description of the land location of the station as determined by a legal land survey system used mainly in Western Canada.

Sed. Progr.:

One-character code to indicate the sediment program type for the collection of sediment data. R-Regular, M-Miscellaneous (See Appendix A - "Sediment Program Type Codes").

Sample No.:

12-characters. This is a unique number assigned for use on all sediment samples collected at the station. One exception is the use of "No Number".

Vertical Code:

A four-character code (See Appendix A - "Sediment Vertical Type Codes"). This is the location on the cross-section of the river at which the single sediment samples are collected. If one of the standard locations is not used the distance in metres will be shown.

HYDEX REMARKS WINDOW

The HYDEX Remarks Report window(Figure 6-12) contains the following fields of information in three columns:

Figure 6-12

The screenshot shows a software window titled "HYDAT CD" with a menu bar (File, Move, Utilities, Export, Help) and a toolbar. The main area is titled "Hydex Report" and contains the following text:

Canadian Hydrological Data (c)1997 Environment Canada
 Station: 14C000 CAMPBELL CREEK NEAR INUVIK Province : NT
 Latitude: 68°16'N Longitude: 139°15'W 1973 to 1974
 Drainage Area: ----- Parameter : Remarks Dist. Oper. Period: -

Remark Type	SEQNO	Remark Text
01 Gen	001	STATION OPERATED AT THE REQUEST OF FISHERIES RESEARCH BOARD OF CANADA FOR HACHENZIE PIPELINE STUDY FIRST SAMPLE COLLECTED JUN 02 1973. DISCONTINUED DEC 31 1974. \$\$STATION REQUESTED BY FISHERIES RESEARCH BOARD FOR HACHENZIE PIPELINE STUDY. ABOUT 22 KM FROM INUVIK ON RIGHT BANK 1.2 KM ABOVE DENSTER HIGHWAY
01 Gen	002	
02 Sed	001	
02 Sed	002	
11 Loc	001	

At the bottom, there is a legend:

- 01 - General Remarks
- 02 - Comments On Sediment Stations
- 11 - Station Location Description

Below the legend is a "Type:" field and a "Bring out selected Station List" button.

Type:

The three-letter abbreviation is displayed (See Appendix A - "Remark Type Codes").

SEQNO:

A three digit number from 001 to 999 used to identify up to 999 lines of description for any one remark.

Text:

The first line of each type of remark is displayed on the screen. If the remark extends beyond the display screen, you can use the vertical and horizontal scroll bars to view the remaining information.

HYDEX OPERATION WINDOW

The HYDEX Operation Report window (Figure 6-13) contains the following fields of information:

Figure 6-13

Canadian Hydrological Data (c)1997 Environment Canada
 Station: 02FE004 HAITLAND RIVER NEAR DONMURROCK Province : ON
 Latitude: 43°49'30"N Longitude: 81°29'26"W 1945 to 1987
 Drainage Area: 1768 Parameter : Operations Hist. Oper. Period: -

Tributary Type	Code	Data Type	Coll. Type	Agency Code	Oper. Cost	Cur Oper	Ann Publ	Hist Publ
T	To	45545	H D	Hyd	-	-	-	-
			S D	Sed	-	-	-	-

Bench Mark ID : Regulation (Nat or Reg)
 Elevation : Begin End Type Beg
 Map : R

Tributary ID Name
 45545 : LAKE HURON

Agency Code Name

Legend:
 H - Hydrometric
 M - Monthly Means Only
 R - Reservoir Contents
 S - Sediment
 T - Water Temperature
 W - Water Quality

Tributary Association | Data Collection Type | Status of Collection | Collection Regulation

Tributary Type:

A one-character code plus a 2-letter abbreviation (See Appendix A - "Tributary Association Code"). For the gauging station on a particular body of water, this will show which watercourse it is a tributary to (To), or which watercourse it is diverted from (Fr), or watercourse it is on (On), i.e., a reservoir.

Tributary Code:

A five-number code which identifies the tributary (water course). The codes are not in Appendix A because there are several thousand of them, but by scrolling down to the next page the Tributary Name may be observed on the screen

Data Coll:**Type:**

A one-letter code to indicate the type of data collected at the station (See Appendix A - "Data Collection Type Codes").

A/D:

A one-letter code to indicate the status of the collection program for each data type. A-Active, D-Discontinued. (See Appendix A - "Data Collection Status Code").

Data Type:

In this column the three-letter Data Type code shows the data type to which the next five columns apply.

- Hyd - Hydrometric data (flow/water levels)
- Sed - Sediment data

Agency Code:

Oper.:

A three-character code which identifies the agency which operates the station (See Appendix A - "Agency Codes"). This field may be blank for discontinued stations. The Agency Name corresponding to the Agency Code can be observed by scrolling down to the next page on the screen.

Cost:

A three-character code which identifies the agency which shares the cost of operating the station. This field may be blank if it is the same as the operating agency.

Operation Periods in Months:

The majority of stations in Canada are operated on a continual basis throughout the year. However there are many stations for which data are only collected for a standard period within the year, and this standard period may have changed over the history of the station. The Operation Periods in Months (three-characters) are displayed in the appropriate columns.

Curr. Oper.:

This is the current period of operation if it differs from the standard annual period.

Ann. Publ.:

This is the standard period of operation of the station which will appear in the annual publication.

Hist Publ.:

This is the standard period which best represents the operation of the station over the period of record. It is used for the historical publication and historical retrievals.

Benchmark ID:

This is a unique identification of the master benchmark used for maintaining gauge datum. It is a new field and not many stations have this information in the database.

Elevation:

An eight-character field for the elevation of the master benchmark.

Map:

This is a map number which identifies the topographic map on which the station could be plotted.

Regulation:

Regulation of the runoff in the basin upstream from the gauge is indicated if known, although it is often difficult to define. Some rivers are regulated only during the day for mill operations, or only during the dry summer months for irrigation, or only a small tributary upstream may be regulated.

Begin:

The year in which the regulation began, if known.

End:

The year in which the natural flow or regulation ended, if known.

Type:

A one-character code for the type of flow: N-natural, R-regulated.

Deg.:

Degree of regulation, if known.

HYDEX HYDROMETRIC RECORD WINDOW

The HYDEX Hydrometric Record Report window (Figure 6-14) contains the following information:

Figure 6-14

Canadian Hydrological Data (c)1997 Environment Canada
 Station: 07EF001 PEACE RIVER AT HUDSON HOPE Province : BC
 Latitude:56°1'39"N Longitude:121°52'56"W 1917 to 1995
 Drainage Area: 69900 Parameter :Hydrometric Hist.Oper.Period: -

Years	Hydrometric Type	Gauge Type	Schedule Code
1917-1922	Q Dis	H Man	S Sea
1947-1948	Q Dis	H Man	Misc
1949-1951	Q Dis	H Man	S Sea
1952-1952	Q Dis	H Man	C Con
1953-1954	Q Dis	H Man	S Sea
1955-1955	Q Dis	H Man	C Con
1956-1957	Q Dis	H Man	S Sea
1958-1968	Q Dis	H Man	C Con
1969-1996	Q Dis	R Rec	C Con

H - Water Level
 Q - Discharge

Hydrometric Type / Gauge Type / Schedule Type

CAPS NUM SCHE CODE

Years:

The consecutive years for which data were collected for a unique combination of the Hydrometric Type, Gauge Type and Operation Schedule. The rows are listed chronological.

Hydrometric Type:

The type of hydrometric data collected, either "DISCHARGE" or "WATER LEVEL". (Appendix A - "Hydrometric Type Codes").

Gauge Type:

The type of 'gauge' used to collect the data; "MANUAL", "RECORDER", "POWER PLANT", or "SUM OF FLOW" (Appendix A - "Gauge Type Codes").

Schedule Code:

The schedule for operating the data collection program during the years, "CONTINUOUS", "SEASONAL" or "MISCELLANEOUS". (Appendix A - "Operation Schedule Codes").

Note: The codes are given in Appendix A but the full description is displayed on the screen.

HYDEX SEDIMENT RECORD WINDOW

The HYDEX Sediment Record Report window (Figure 6-15) contains the following information:

Figure 6-15

Years	Sediment Type	Data Type	Sample Method	Schedule Code
1968	T	Tonnes	BH BH PS	H Nan S Sea
1968	T	Tonnes	. Dis.Sol.	M Nan S Sea
1968	T	Tonnes	VT VT	H Nan S Sea
1969	T	Tonnes	BH BH PS	H Nan C Con
1969	T	Tonnes	. Dis.Sol.	M Nan C Con
1969	T	Tonnes	VT VT	H Nan C Con
1970	T	Tonnes	BH BH PS	H Nan C Con
1970	T	Tonnes	. Dis.Sol.	M Nan C Con
1970	T	Tonnes	VT VT	H Nan C Con
1971	T	Tonnes	DI Depth	H Nan C Con
1971	T	Tonnes	. Dis.Sol.	M Nan C Con
1971	T	Tonnes	VT VT	H Nan C Con
1972	T	Tonnes	DI Depth	H Nan C Con
1972	T	Tonnes	. Dis.Sol.	M Nan C Con
1972	T	Tonnes	VT VT	H Nan C Con
1973	T	Tonnes	. Dis.Sol.	M Nan C Con
1973	T	Tonnes	VT VT	H Nan C Con
1974	T	Tonnes	DI Depth	H Nan C Con
1974	T	Tonnes	. Dis.Sol.	M Nan C Con
1974	T	Tonnes	VT VT	H Nan C Con
1975	T	Tonnes	DI Depth	H Nan C Con
1975	T	Tonnes	. Dis.Sol.	M Nan C Con
1975	T	Tonnes	VT VT	H Nan C Con
1976	T	Tonnes	. Dis.Sol.	M Nan C Con
1976	T	Tonnes	VT VT	H Nan C Con
1977	T	Tonnes	. Dis.Sol.	M Nan C Con

DI - Depth Integrating -Part. Size
PI - Point Integrating -Part. Size
BP - Bed Load - Particle Size
BT - Bed Load - Tonnes
BM - Bed Material -Part. Size
DS - Dissolved Solids

Record Type / Data Type / Sampling Method / Operation Schedule

COPIES NUM SCALE DATE

Years:

Each year for which sediment data have been collected is listed separately for a unique combination of the Sediment Type and Data Type. The years are listed chronologically by Sediment Type.

Sed. Type:

The sediment type is the type of sediment records collected and is displayed as either "INST." or "TONNES". INST. refers to instantaneous samples taken at a fixed vertical location in the river cross-section. TONNES indicates that the daily mean concentration for the river cross-section have been computed and can be expressed as a sediment load in TONNES. (See Appendix A - "Sediment Record Type Codes" - the abbreviation is displayed on the screen).

Data Type:

The type of sediment data being collected each year is displayed (See Appendix A - "Sediment Data Type Codes" - the full description is displayed on the screen).

Sample Method:

The method by which sediment samples are collected each year for each data type is displayed (See Appendix A - "Sediment Sample Method Codes" - the full description is displayed on the screen).

Schedule Code:

The schedule for operating the data collection program during the year (See Appendix A - "Operation Schedule Codes" - the full description is displayed on the screen).

HYDEX REVIEW WINDOW

The HYDEX Review Report window (Figure 6-16) contains the following information:

Figure 6-16

HYDAT CD
File Move Utilities Export Help

Hydex Report

Canadian Hydrological Data (c)1997 Environment Canada

Station : 01B0001 SOUTHWEST MIRAMICHI RIVER AT BLACKVILLE Prov-Terr-State : NB
Latitude:46°44'10"N Longitude:65°49'36"W Observation Period for Station 1918 to 1996
Region : Dartmouth Drainage Area : 5050 (km²) Parameter : Review Hist.Oper.Period : -

Years	Type	SEQ	Text
1918-1970	H	Hyd	

H - Hydrometric
S - Sediment

Type

CAPS NUM SCRL DVR

Years:

The years showing the period of record which was reviewed during a particular station review.

Review Type:

The type of data which were reviewed, "HYD" for review of hydrometric data or "SED" for review of sediment data (See Appendix A - "Review Data Type Codes" - the abbreviations are displayed on the screen).

Additional textural information about the review is not yet stored on the database but will appear in future editions of the HYDAT CD-ROM when available.

HYDEX EQUIPMENT WINDOW

The HYDEX Equipment Report window (Figure 6-17) contains the following information:

Figure 6-17

Canadian Hydrological Data (c)1997 Environment Canada
 Station: 04AC008 RED SUCKER LAKE AT RED SUCKER LAKE Province : MB
 Latitude:54°9'23"N Longitude:93°33'53"W 1978 to 1991
 Drainage Area:----- Parameter :Equipment Dist.Oper.Period: -

Manual Gauge	Recorder	ID	Sensor	Pressure	Interface
	01 Steve A	1	02 Press.S.	1 Gas Purg	1 Servo No
	01 Steve A				

ID	Type Make	Data Type
1	A	03 HG TY 08 28

HG - Height, River Stage
 IM - Ice Movement (ICEOUT)
 PC - Prec. Accumulator
 PR - Prec. Rate (Rain-Tipping Buck)
 QR - Discharge, River
 RI - Radiation, Incoming Solar

Manual Gauge Type / Recorder Gauge Type / Sensor Type / Pressure Type / Interface Type / Telemetry Type / Telemetry Make / Data Type

Manual Gauge:

Manual gauges which are currently at the gauge site, or in some cases were at the gauge site when the station was discontinued, are displayed (See Appendix A - "Manual Gauge Type" - the code and abbreviation are displayed on the screen).

Recorder Gauge

Recorder:

Generally there is only one recorder at a particular site, but if there are more than one then each recorder is displayed in a separate row with the appropriate Sensor Type, Pressure Type and Interface Type (See Appendix A - "Recorder Gauge Codes" - the code and an abbreviation are displayed on the screen)

ID:

A one-character code for the number of the recorder gauge of a particular type (usually I).

Sensor:

The sensor type for the water level recorder (See Appendix A - "Recorder Sensor Codes" - the code and an abbreviation are displayed on the screen)

Pressure:

The type of pressure system used for the water level recorder (See Appendix A - "Recorder Pressure Codes" - the code and an abbreviation are displayed on the screen).

Interface:

The type of interface between the recorder and sensor device (See Appendix A - "Recorder Interface Codes" - the code and an abbreviation are displayed on the screen).

Telemetry

ID:

Generally there is only one telemetric unit at a particular site, but the unit is identified by a one-character code so that all units can be identified, one per row.

Type:

This is the type of telemetric transmission at a station (See Appendix A - "Telemetric Type Codes" - the code and an abbreviation are displayed on the screen).

Make:

This is the make of the telemetric unit (See Appendix A - "Telemetric Make Codes" - the code and an

abbreviation are displayed on the screen).

Data Type:

This is the type of data transferred by a specific telemetric unit. Up to six data types can be displayed for each unit (See Appendix A - "Telemetric Data Type Codes" - the code and an abbreviation are displayed on the screen).

APPENDIX A HYDAT CODES

PROVINCE CODES

AB = Alberta
BC = British Columbia
MB = Manitoba
NB = New Brunswick
NF = Newfoundland
NS = Nova Scotia
NT = Northwest Territories
NU = Nunavut
ON = Ontario
PE = Prince Edward Island
QC = Quebec
SK = Saskatchewan
YT = Yukon Territory

STATE CODES

AK = Alaska
ID = Idaho
ME = Maine
MI = Michigan
MN = Minnesota
MT = Montana
ND = North Dakota
NH = New Hampshire
NY = New York
OH = Ohio
PA = Pennsylvania
VT = Vermont
WA = Washington
WI = Wisconsin

REGION CODES

2 Vancouver
3 Calgary
4 Winnipeg
5 Guelph
6 Longueuil
7 Dartmouth
8 Regina
9 Yellowknife

DAILY AND EXTREME CODES

A Manual Gauge
B Ice Conditions
D Dry
E Estimated
R Revised
S Revised and Manual Gauge
T Revised and Ice Conditions
V Revised and Dry
W Revised and Estimated
Z Revised and Sample Collected This Day

OTHER INSTALLATION TYPES

01 = Cableway
02 = Metering Bridge
03 = Cable Carrier
04 = Permanent Boat Cable
05 = Volumetric Equipment
06 = Wading Apron
07 = Flume
10 = Artificial Control
20 = Velocity Recorder
21 = Flow Meter (meter inside pipe)
22 = Ultrasonic Flow Meter
30 = Turbidity Meter
31 = Suspended Solids Recorder
32 = Automatic Sampler
40 = Thermograph (Water Temperature)
41 = Precipitation (Rain or Snow)
42 = Continuous Air Temperature
50 = A.C. Power
51 = Telephone
52 = Dry Cell Battery
53 = Solar Panel
54 = Transducer
55 = Propane Heater
99 = Other

AGENCY CODES

005 ABITIBI-PRICE INC.
007 ABITIBI-PRICE INC., GRAND FALL DIVISION
010 ALBERTA DEPARTMENT OF THE ENVIRONMENT
015 ALBERTA EASTERN ROCKIES FOREST CONSERVATION BOARD
016 ALBERTA OIL SANDS ENVIRONMENTAL RESEARCH PROGRAM
017 ALBERTA RESEARCH COUNCIL
018 ALBERTA FOREST SERVICE
020 ALTA. ST MARY-MILK RIVER DEVELOPMENT COMMISSION
030 ALGOMA STEEL CORPORATION LIMITED
035 ALCAN SMELTERS AND CHEMICALS LIMITED
037 AMAX MINING
040 ASSOCIATED ENGINEERING SERVICES LIMITED
041 ATOMIC ENERGY OF CANADA
043 BLACK MOUNTAIN IRRIGATION DISTRICT
044 BOISE CASCADE CANADA LIMITED
050 BRITISH COLUMBIA CRESTON WILDLIFE MANAGEMENT AREA
055 BRITISH COLUMBIA MINISTRY OF ENVIRONMENT
060 B.C. MINISTRY OF RECREATION AND CONSERVATION
062 BRITISH COLUMBIA ELECTRIC RAILWAY COMPANY
065 BRITISH COLUMBIA FOREST PRODUCTS LIMITED
070 BRITISH COLUMBIA MINISTRY OF FORESTS
075 BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
090 CANADA LAND AND IRRIGATION COMPANY
095 CANADIAN COLLIERS (DUNSMUIR) LIMITED
097 CANADIAN FORESTRY SERVICE (DOE) (CANADA)
105 CANADIAN NATIONAL RAILWAYS
110 CANADIAN PACIFIC RAILWAY
115 CANADIAN UTILITIES LIMITED
116 CANADIAN WILDLIFE SERVICE (DOE) (CANADA)
120 CHURCHILL FALLS (LABRADOR) CORPORATION LIMITED
125 CHURCHILL RIVER POWER COMPANY
130 CITY OF CALGARY WATER WORKS DEPARTMENT
140 CITY OF CRANBROOK
155 CITY OF NANAIMO
170 CITY OF VICTORIA
175 CITY OF WINNIPEG HYDRO-ELECTRIC SYSTEM
180 COLUMBIA RIVER LUMBER COMPANY
185 COMINCO LIMITED
190 CONSOLIDATED-BATHURST COMPANY LIMITED

195 CONSOLIDATED MINING AND SMELTING COMPANY LIMITED
205 CORPORATION OF THE DISTRICT OF NORTH VANCOUVER
210 CRESTON DYKING DISTRICT
212 DEER LAKE POWER COMPANY LTD.
215 DEPARTMENT OF AGRICULTURE (CANADA)
218 DEPARTMENT OF FISHERIES AND OCEANS (CANADA)
220 DEPT. OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
225 DEPARTMENT OF NATIONAL DEFENCE (CANADA)
230 DEPARTMENT OF PUBLIC WORKS (CANADA)
240 DOMINION TEXTILES COMPANY
245 DOMTAR PULP AND PAPER COMPANY
250 DONNACONA PAPER COMPANY
255 DUCKS UNLIMITED
265 EASTERN IRRIGATION DISTRICT
270 EDDY FOREST PRODUCTS LIMITED
275 FISHERIES RESEARCH BOARD OF CANADA
280 OCEAN SCIENCE AND SURVEYS (DFO) (CANADA)
290 GEORGIA-PACIFIC CORPORATION
293 GREAT LAKES FOREST PRODUCT LIMITED
295 GREAT LAKES POWER COMPANY LIMITED
300 GREAT NORTHERN POWER COMPANY
305 GREATER CAMPBELL WATER DISTRICT
310 GREATER NANAIMO WATER DISTRICT
315 GREATER VANCOUVER WATER DISTRICT
320 GREATER WINNIPEG WATER DISTRICT
322 GULF POWER COMPANY
323 HARDY ASSOCIATES (1978 LIMITED)
325 HEATH STEELE MINES LIMITED
330 HINTON FORESTRY SCHOOL
335 INTERNATIONAL LAKE SUPERIOR BOARD
337 INTERNATIONAL NIAGARA COMMITTEE
340 INTERNATIONAL NICKEL COMPANY OF CANADA LIMITED
345 INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION
350 INTERNATIONAL ST. LAWRENCE RIVER BOARD OF CONTROL
355 IRON ORE COMPANY OF CANADA LIMITED
357 JAMES MACLAREN COMPANY LIMITED
358 JOHN FORD COMPANY LIMITED
360 LETHBRIDGE NORTHERN IRRIGATION DISTRICT
365 MACLAREN-QUEBEC POWER COMPANY
370 MACMILLAN BLOEDEL LIMITED
375 MAINE PUBLIC SERVICE COMPANY
380 MANITOBA DEPT. OF MINES, RES. AND ENV. MANAGEMENT
385 MANITOBA HYDRO
390 MANITOBA WATER RESOURCES BRANCH
395 MINISTRY OF TRANSPORT (CANADA)
400 NEW BRUNSWICK DEPARTMENT OF THE ENVIRONMENT
405 NEW BRUNSWICK ELECTRIC POWER COMMISSION
410 NEW BRUNSWICK WATER RESOURCES BRANCH
425 NEWFOUNDLAND AND LABRADOR HYDRO
430 NEWFOUNDLAND DEPARTMENT OF ENVIRONMENT
435 NEWFOUNDLAND LIGHT AND POWER COMPANY LIMITED
440 NORTH WESTERN PULP AND POWER LIMITED
445 NORTHERN CANADA POWER COMMISSION
450 NORTHERN TRANSPORT COMPANY LIMITED
455 NOVA SCOTIA DEPARTMENT OF ENVIRONMENT
460 NOVA SCOTIA DEPARTMENT OF LANDS AND FORESTS
465 NOVA SCOTIA POWER CORPORATION
470 NOVA SCOTIA WATER PLANNING & MANAGEMENT BRANCH
477 ONTARIO HYDRO
480 ONTARIO MINISTRY OF NATURAL RESOURCES
485 ONTARIO MINISTRY OF THE ENVIRONMENT
490 ONTARIO MINNESOTA PULP AND PAPER COMPANY LIMITED
493 ORILLIA LIGHT AND POWER
494 PARKS CANADA (DOE) (CANADA)
495 PEMBROKE ELECTRIC LIGHT COMPANY
500 PRAIRIE FARM REHABILITATION ADMINISTRATION
505 PRICE BROTHERS AND COMPANY LIMITED
515 PRINCE EDWARD ISLAND DEPT. OF COMMUNITY AFFAIRS

520 QUEBEC CARTIER MINING COMPANY
525 QUEBEC DEPARTMENT OF NATURAL RESOURCES
530 QUEBEC HYDRO-ELECTRIC COMMISSION
535 QUEBEC NORTH SHORE PAPER COMPANY
540 QUEEN'S UNIVERSITY AT KINGSTON
543 SAINT-RAYMOND PAPER COMPANY
545 SASKATCHEWAN DEPARTMENT OF THE ENVIRONMENT
550 SASKATCHEWAN POWER CORPORATION
555 SASKATCHEWAN RESEARCH COUNCIL
556 SASKATCHEWAN WATER CORPORATION
558 SMELTER POWER CORPORATION
560 SPRUCE FALLS POWER AND PAPER COMPANY
565 ST. LAWRENCE PAPER MILLS COMPANY
570 ST. LAWRENCE SEAWAY AUTHORITY
575 ST. MARY RIVER IRRIGATION DISTRICT
580 SYNCRUDE CANADA LIMITED
583 THE YUKON ELECTRICAL COMPANY LTD.
585 TOWN OF FORT ST. JOHN
588 TRANSALTA UTILITIES CORPORATION
590 TWIN FALLS POWER CORPORATION LIMITED
595 UNITED IRRIGATION DISTRICT
600 UNITED STATES GEOLOGICAL SURVEY
605 UNITED TOWNS ELECTRIC COMPANY LIMITED
610 UNIVERSITY OF ALBERTA
615 UNIVERSITY OF BRITISH COLUMBIA
620 UNIVERSITY OF CALGARY BIOLOGY DEPARTMENT
625 UNIVERSITY OF ILLINOIS
630 UNIVERSITY OF SASKATCHEWAN
635 VANCOUVER POWER COMPANY
640 VERNON IRRIGATION DISTRICT
645 VILLAGE OF LUMBY
647 WATER SURVEY OF CANADA (DOE) (CANADA)
650 WEST KOOTENAY POWER
655 WESTERN IRRIGATION DISTRICT
660 WESTMINSTER POWER COMPANY
665 WHITE EAGLE SILVER MINES LIMITED
670 WHITE PASS AND YUKON ROUTE
675 WINNIPEG ELECTRIC RAILWAY COMPANY
705 ADM. DE LE VOIE MARITIME DU SAINT-LAURENT
710 CITÉ DE MAGOG
715 HYDRO-ONTARIO
720 HYDRO-QUÉBEC
725 LA COMPAGNIE ALUMINIUM DU CANADA
730 LA COMPAGNIE DOMINION TEXTILES LIMITEÉ
735 LA COMPAGNIE PRICE LIMITEÉ
740 MINISTÈRE DE L'ENVIRONNEMENT DU QUÉBEC
745 MINISTÈRE DES TRANSPORTS (CANADA)
750 MINISTÈRE DES TRAVAUX PUBLICS (CANADA)
753 SCIENCES ET LEVES OCEANIQUES (MPO) (CANADA)
760 UNIVERSITÉ DE MONTRÉAL
765 UNIVERSITÉ DU QUÉBEC
770 UNIVERSITÉ LAVAL
775 UNIVERSITÉ MCGILL
780 VILLE DE SHERBROOKE
785 VILLE DE QUÉBEC
900 B.C. SEASONAL STATIONS
901 ONT. MIN. OF THE ENV. AND MIN. OF NAT. RES.
902 ONT. MIN. OF NAT. RES. AND ONT. HYDRO
903 FEDERAL - OTHER FEDERAL
904 FEDERAL - PRIVATE
905 OTHER FEDERAL
906 PRIVATE
908 DOMAIN AND MANNES DRAIN PROJECT

DATUM CODES

005 ALBERTA DEPARTMENT OF HIGHWAYS DATUM
007 ALCAN DATUM
010 ASSUMED DATUM

011 ASSUMED DATUM NO.1
012 ASSUMED DATUM NO.2
013 ASSUMED DATUM NO.3
014 ASSUMED DATUM NO.4
015 CANADA LAND AND IRRIGATION COMPANY DATUM
020 CANADIAN NATIONAL RAILWAYS DATUM
025 CANADIAN PACIFIC RAILWAY DATUM
026 CHURCHILL RIVER DATUM (MANITOBA HYDRO)
027 CITY OF CALGARY DATUM
029 CITY OF SEATTLE BOUNDARY DAM DATUM
030 CITY OF SEATTLE ROSS DAM DATUM
032 DEPARTMENT OF PUBLIC WORKS DATUM
034 FRENCH RIVER DATUM
035 GEODETIC SURVEY OF CANADA DATUM
036 HUDSON BAY RAILWAY DATUM
040 GEODETIC SURVEY OF CANADA (OLD) DATUM
041 GRAND TRUNK RAILWAY DATUM
042 INTERNATIONAL BOUNDARY COMMISSION DATUM
045 INTERNATIONAL GREAT LAKES DATUM (1955)
046 INTERNATIONAL GREAT LAKES DATUM (1985)
048 INT. PACIFIC SALMON FISHERIES COMMISSION DATUM
049 IRRIGATION SURVEY DATUM
050 LAKE OF THE WOODS DATUM
051 LAC SEUL DATUM
052 LAKE WINNIPEG DATUM (1986)
055 LNID EAST DATUM
058 MANITOBA LAND SURVEYS DATUM
060 MANITOBA-ONTARIO BOUNDARY SURVEY DATUM
065 NEW YORK MEAN SEA LEVEL DATUM
067 ONTARIO HYDRO PROJECT DATUM
068 PORTAGE DIVERSION DATUM
070 PRAIRIE FARM REHABILITATION ADMINISTRATION DATUM
075 PROVINCE OF SASKATCHEWAN DATUM
080 RECLAMATION SERVICE OF CANADA DATUM
082 SASKATCHEWAN DEPT. OF NATURAL RESOURCES DATUM
085 SAND HEADS DATUM
087 ST. MARY RIVER IRRIGATION DISTRICT DATUM
089 TEMISKAMING AND NORTHERN ONTARIO RAILWAY DATUM
090 TOPOGRAPHIC SURVEY DATUM
093 TRANSALTA UTILITIES DATUM
095 UNITED STATES AND CANADA BOUNDARY SURVEY DATUM
100 UNITED STATES COAST AND GEODETIC SURVEY DATUM
105 UNITED STATES 108 WATER POWER SURVEY DATUM
110 APPROXIMATE GEODETIC SURVEY OF CANADA DATUM
113 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1913 ADJ.)
114 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1914 ADJ.)
115 GEODETIC SURVEY OF CANADA DATUM PRIOR TO 1928 ADJ.
123 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1923 ADJ.)
127 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1927 ADJ.)
128 GEODETIC SURVEY OF CANADA DATUM 1928 ADJUSTMENT
129 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1929 ADJ.)
130 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1930 ADJ.)
131 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1931 ADJ.)
132 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1932 ADJ.)
133 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1933 ADJ.)
134 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1934 ADJ.)
135 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1935 ADJ.)
136 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1936 ADJ.)
137 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1937 ADJ.)
138 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1938 ADJ.)
139 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1939 ADJ.)
140 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1940 ADJ.)
141 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1941 ADJ.)
142 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1942 ADJ.)
143 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1943 ADJ.)
144 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1944 ADJ.)
145 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1945 ADJ.)
146 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1946 ADJ.)

147 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1947 ADJ.)
148 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1948 ADJ.)
149 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1949 ADJ.)
150 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1950 ADJ.)
151 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1951 ADJ.)
152 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1952 ADJ.)
153 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1953 ADJ.)
154 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1954 ADJ.)
155 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1955 ADJ.)
156 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1956 ADJ.)
157 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1957 ADJ.)
158 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1958 ADJ.)
159 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1959 ADJ.)
160 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1960 ADJ.)
161 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1961 ADJ.)
162 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1962 ADJ.)
163 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1963 ADJ.)
164 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1964 ADJ.)
165 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1965 ADJ.)
166 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1966 ADJ.)
167 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1967 ADJ.)
168 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1968 ADJ.)
169 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1969 ADJ.)
170 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1970 ADJ.)
171 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1971 ADJ.)
172 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1972 ADJ.)
173 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1973 ADJ.)
174 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1974 ADJ.)
175 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1975 ADJ.)
176 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1976 ADJ.)
177 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1977 ADJ.)
178 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1978 ADJ.)
179 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1979 ADJ.)
180 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1980 ADJ.)
181 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1981 ADJ.)
182 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1982 ADJ.)
183 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1983 ADJ.)
184 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1984 ADJ.)
185 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1985 ADJ.)
186 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1986 ADJ.)
187 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1987 ADJ.)
188 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1988 ADJ.)
189 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1989 ADJ.)
190 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1990 ADJ.)
191 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1991 ADJ.)
192 GEODETIC SURVEY OF CANADA DATUM (LOCAL 1992 ADJ.)
200 GEODETIC SURVEY OF CANADA DATUM (MAN. GOVT. EXT.)
205 GEODETIC SURVEY OF CANADA DATUM (MAN. HYDRO EXT.)
305 ASSUMED DATUM AT WHITE PASS AND YUKON DOCK 1944-60
405 ARBITRAIRE
410 SERVICE GÉODÉSIQUE DU CANADA
415 GÉODÉSIQUES
420 GÉODÉSIQUES ACTUELLES
425 SERVICE GÉODÉSIQUE DU CANADA (ANCIEN NIVEAU DE REFERENCE)
430 INTERNATIONAL DES GRANDS LACS (1955)
431 INTERNATIONAL DES GRANDS LACS (1985)
435 MINISTÈRE DES TRAVAUX PUBLICS
469 SERVICE GÉODÉSIQUE DU CANADA (AJUST. LOCAL 1969)
470 SERVICE GÉODÉSIQUE DU CANADA (AJUST. LOCAL 1970)
475 SERVICE GÉODÉSIQUE DU CANADA (AJUST. LOCAL 1975)

CATEGORY CODES

A WATER SURVEY OF CANADA
B PROVINCE
C TERRITORY
D PRIVATE AGENCY
E OTHER FEDERAL AGENCY

DATA COLLECTION STATUS CODE

A ACTIVE
D DISCONTINUED

DATA COLLECTION TYPE CODES

H HYDROMETRIC
M MONTHLY MEANS ONLY
Q WATER QUALITY
R RESERVOIR CONTENTS
S SEDIMENT
T TEMPERATURE (CONTINUOUS WATER)
W WATER QUALITY

DATA TYPE CODES

1 LOCAL DATUM
2 OFFICIAL DATUM
3 OTHER DATUM

GAUGE TYPE CODES

M MANUAL GAUGE
P POWER PLANT
R RECORDER
S SUM. OF FLOW

HYDROMETRIC TYPE CODES

H WATER LEVEL
Q DISCHARGE

INSTANTANEOUS SEDIMENT TYPES

DI DEPTH INTEGRATING
SV SPLIT VERTICAL DEPTH INTEGRATING
PI POINT INTEGRATING
BL BEDLOAD
BM BED MATERIAL

MANUAL GAUGE TYPES

	<u>Abbreviations</u>	
01 STAFF	Staff	
02 CANTILEVER	Canti	
03 WIRE WEIGHT	WireW	
04 CREST STAGE	Crest	
05 SLOPE	Slope	
06 BENCH MARK	Bench	
07 REFERENCE POINT	RefPt	
08 ELECTRIC CONTACT (TAPE)		Elec.
09 CHAIN	Chain	
10 HOOK	Hook	
11 INDICATOR	Indic	
12 VALVE SETTING	Valve	
99 OTHER	Other	

OPERATION SCHEDULE CODES

C CONTINUOUS
M MISCELLANEOUS
S SEASONAL

PARAMETER CODES

	<u>Abbreviations</u>	
1 DISCHARGE (FLOW)	Flow	
2 WATER LEVEL	Levels	
3 SUSP. SED. CONCENTRATION		Conc
4 SUSP. SED. LOAD	Load	
45 INST. SED. (DEPTH)	Depth	
46 INST. SED. (POINT)	Point	

47 INST. SED. (BED MATERIAL)	Bed-M
48 INST. SED. (BED LOAD)	Bed-L

REMARK TYPE CODES

	<u>Abbreviations</u>
01 GENERAL REMARKS	GEN
02 COMMENTS ON SEDIMENT STATIONS	SED
11 STATION LOCATION DESCRIPTION	LOC

RECORDER GAUGE CODES

	<u>Abbreviations</u>
01 STEVENS TYPE A	SteveA
02 STEVENS TYPE F	SteveF
03 OTT	Ott
04 FISHER AND PORTER (PUNCH)	Fish/P
05 STEVENS (PUNCH)	SteveP
06 WINNIPEG TYPE CURVED-LINE	Winnip
10 SCIENTIFIC INSTRUMENTS	Instr.
11 CAE AIRCRAFT	CaeAir
20 STATHAM	Stathm
21 SHERLOCK	Sherlk
30 FOXBORO	Foxbor
99 OTHER	Other

RECORDER INTERFACE CODES

	<u>Abbreviations</u>
1 SERVO-MANOMETER	Servo M
2 SERVO-BEAM-BALANCE	Servo B
3 BELLWS	Bellows
4 ELECTRONIC DATA AQUISITION SYSTEM	EDAS

RECORDER PRESSURE CODES

	<u>Abbreviations</u>
1 GAS PURGE	Gas P
2 DIAPHRAGM	Diaph

RECORDER SENSOR CODE

	<u>Abbreviations</u>
01 FLOAT (WELL)	Float
02 PRESSURE SYSTEM	Press

REVIEW CODES

	<u>Abbreviations</u>
H HYDROMETRIC	HYD
S SEDIMENT	SED

SEDIMENT CONCENTRATION CODES

B BOTTOM
 C COARSE MATERIAL PRESENT
 F SAMPLE BOTTLE FILLED
 G ORGANIC MATERIAL PRESENT
 K SAMPLE(S) COLLECTED IN A SINGLE VERTICAL
 R SAMPLES COLLECTED IN SEVERAL VERTICALS
 T TOP

SEDIMENT DATA TYPE CODES

BM BED MATERIAL	- PARTICLE SIZE
BP BED LOAD	- PARTICLE SIZE
BT BED LOAD	- TONNES
BV BED LOAD	- VOLUMETRIC
BW BED LOAD	- VOL. & PART. SIZE
BX BED LOAD	- TONNES & PART. SIZE
DI DEPTH INTEGRATING	- PART. SIZE
DS DISSOLVED SOLIDS	

PI POINT INTEGRATING - PART. SIZE
WT WATER TEMPERATURE

SEDIMENT PROGRAM TYPE CODES

M MISCELLANEOUS
R REGULAR

SEDIMENT RECORD TYPE CODES

	<u>Abbreviations</u>
I INSTANTANEOUS	INST.
T TONNES	TONNES

SEDIMENT SAMPLE METHOD CODES

A AUTOMATIC
B BOTH
M MANUAL

SEDIMENT SAMPLING VERTICAL SYMBOL CODES

K	Sampling Vertical Not At The Regular Single Vertical From Left Bank
L	Sediment Measurement Vertical Not At The Regular Measurement Cross-Section From Left Bank
M	Sediment Measurement Vertical
X	Sampling Vertical Not At The Regular Single Vertical
Z	Sediment Measurement Vertical Not At The Regular Measurement Cross-Section

SEDIMENT SAMPLING VERTICAL TYPE CODES

----	UNKNOWN
1QLB	ONE-QUARTER FROM LEFT BANK
1QRB	ONE-QUARTER FROM RIGHT BANK
3QLB	THREE-QUARTER FROM LEFT BANK
3QRB	THREE-QUARTER FROM RIGHT BANK
HWLB	HIGH WATER LEFT BANK
HWRB	HIGH WATER RIGHT BANK
MULT	COMPOSITE SEDIMENT MEASUREMENT
WELB	WATERS EDGE LEFT BANK
WERB	WATERS EDGE RIGHT BANK

TRIBUTARY ASSOCIATION CODE

	<u>Abbreviations</u>
1 TRIBUTARY TO	TO
2 TRIBUTARY FROM	FR
3 TRIBUTARY ON (PART OF)	ON

TELEMETRIC DATA TYPE CODE

	<u>Abbreviations</u>
HG HEIGHT, RIVER STAGE	Hght
IM ICE, MOVEMENT (ICE OUT)	Ice M
PC PREC., ACCUMULATOR	PrecA
PR PREC. RATE (RAIN-TIPPING BUCK)	PrecR
QR DISCHARGE, RIVER	Disch
RI RADIATION, INCOMING SOLAR	Radia
TA TEMPERATURE, AIR (AMBIENT)	TeAir
TW TEMPERATURE, WATER	TeWat
TY TEMPERATURE, SURFACE (DCP)	TeSur
UD WIND, DIRECTION	WndDi
US WIND, SPEED	WndSp
VB VOLTAGE, BATTERY	VolBa
WA WATER, DISSOLVED NIT. & ARGON	WatAr
WH WATER, DISSOLVED HYDR. SULFIED	WatHy
WQ WATER, QUALITY	WatQu
WV WATER, VELOCITY	WatVe
XR HUMIDITY, RELATIVE	HumRe
ZA RECORDER CLOCK	RecCl

ZB NITROGEN TANK PRESSURE	NitTa
ZC SAMPLING OPERATION	SamOp
ZD DOOR OPENING COUNTER	DorCt
ZE EMERGENCY SIGNAL GENERATOR	EmSig
ZZ OTHER	Other

TELEMETRIC MAKE CODES

	<u>Abbreviations</u>
01 BALL BROTHERS	BallBr
02 BRISTOL	Brist
03 BRISTOL HYDROMET	BristH
04 HANDAR	Handar
05 LABARGE	Labarg
06 MAGNAVOX	Magnav
07 SUTRON	Sutron
08 SYNERGETICS	Synerg
09 VALCOM	
10 LEOPOLD & STEVENS	
99 OTHER	Other

TELEMETRIC TYPE CODES

	<u>Abbreviations</u>
1 TELEPHONE - AUDIO	T-A
2 TELEPHONE - DIGITAL	T-D
3 RADIO	RAD
4 SATELLITE (DCP)	SAT
5 MANUAL DATA ENTRY	MAN

TIME ZONE CODES

AST ATLANTIC STANDARD TIME
 CST CENTRAL STANDARD TIME
 EST EASTERN STANDARD TIME
 MST MOUNTAIN STANDARD TIME
 PST PACIFIC STANDARD TIME
 NST NEWFOUNDLAND STANDARD TIME
 YST YUKON STANDARD TIME
 YET YUKON EASTERN TIME
 YWT YUKON WESTERN TIME
 NDT NEWFOUNDLAND DAYLIGHT SAVINGS TIME
 ADT ATLANTIC DAYLIGHT SAVINGS TIME
 EDT EASTERN DAYLIGHT SAVINGS TIME
 MDT MOUNTAIN DAYLIGHT SAVINGS TIME
 CDT CENTRAL DAYLIGHT SAVINGS TIME
 PDT PACIFIC DAYLIGHT SAVINGS TIME

APPENDIX B

HYDAT EXPORT AND FILE FORMATS

CANADIAN USER FORMAT

Discharge

Daily Mean (Format 79-041)

This retrieval produces three card images (records) per month for daily discharges in 79-041 format as follows:

Column(s)	Description
1	code for type of data and units: 1 - discharges in cubic metres per second
2-8	station number, e.g., 08AA023
9-11	year, e.g., 986 for 1986
12-13	month, e.g., 07 for July
14	code for time interval: 1 - daily figures from day 1 to day 10 2 - daily figures from day 11 to day 20 3 - daily figures from day 21 to day 31
15-80	10 or 11 six-digit data fields; refer to notes I and 2.

Note 1. Description of Data Fields:

Each data field has six positions. The first five positions contain daily discharge data, right-justified, with a decimal point if necessary; the sixth position contains a symbol:

A - Manual Gauge, B - Ice Conditions, E - Estimated, R - Revised within the last two years, S - Revised (and Manual Gauge), T - Revised (and Ice Conditions), W - Revised (and Estimated), or a blank for no symbol. A negative value is entered with a minus sign just to the left of the number, e.g., -12.3 or -0.001. The first data field is in columns 15-20. The successive fields are for consecutive days depending on the interval (column 14) used. Whenever data are missing, the value -9999 is entered in positions 1-5, and position 6 contains a blank.

Note 2. Daily Figures:

Daily discharges for each month on file are written on three records. The first record (1 in column 14) contains data for 10 days from day 1 to day 10; columns 75 - 78 are not used; the number of days in the month, e.g., 30 for November, is punched in columns 79-80. The second record (2 in column 14) contains 10 days from day 11 to day 20; columns 75-80 are not used. The third record (3 in column 14) contains 11 days from day 21 to day 31; the figure -1111 is punched in the appropriate field for days that do not apply to the month, e.g., 30 and 31 for February 1984, and position 6 contains a blank.

Discharge

Extreme Instantaneous (Format 79-101)

This retrieval produces card images (records) of annual maximum instantaneous peak discharges in 79-101 format as follows:

Column(s)	Description
1	code for type of data and units: 1 - discharge in cubic metres per second
2	blank
3-9	station number, e.g., 04AA001
10	blank
11-13	year, e.g., 986 for 1986
14-15	month, e.g., 03 for March
16-17	day, e.g., 02 or 27
18-21	time of day, using the 24-hour clock, e.g., 0323 for 3:23 a.m.
22-23	time zone, e.g., ES for Eastern Standard Time
24-32	maximum instantaneous discharge, right-justified, with a decimal point if necessary
33-54	same as columns 11 to 32 above
55-76	same as columns 11 to 32 above
77-80	beginning and ending months of the year or standard period (for discharges only)

Note 1. Description of Data Fields:

Each data field has twenty-two positions. The first thirteen positions contain the date and time of occurrence, and the discharge is entered in the next eight positions, right-justified with a decimal point if necessary. The twenty-second position contains a symbol:

A - Manual Gauge, B - Ice Conditions (for discharges only), E - Estimated, R - Revised within the last two years, S - Revised (and Manual Gauge), T - Revised (and Ice Conditions - discharge only), W - Revised (and Estimated), or a blank for no symbol. The successive fields are for the next available figure and may not be the following year if a figure is not available for that year.

Note 2. Annual Maximum Instantaneous Figures:

Three instantaneous discharges are written per record together with their respective year, month, day, time of day and time zone. Only the years with data available are written. All the records for any one station will each have three instantaneous discharges except possibly the last one, which may have only one or two. The month, day, time of day, or time zone or any combination of these may not be available in some cases, therefore, the associated field would be left blank.

Discharge

Extreme Daily (Format 79-113)

This retrieval produces card images (records) of annual maximum and minimum daily discharges in 79-113 format as follows:

Column(s)	Description
1	code for type of data and units: 1 - discharge in cubic metres per second
2	blank
3-9	station number, e.g., 05AB003
10-11	blank
12-14	year, e.g., 986 for 1986
15-16	month in which maximum occurred, e.g., 06 for June
17-18	day, e.g., 02 or 27
19-27	annual maximum daily mean, right-justified, with decimal point if necessary, and symbol
28-29	month in which minimum occurred, e.g., 10 for October
30-31	day, e.g., 07 or 31
32-40	annual minimum daily mean, right-justified, with decimal point if necessary, and symbol
41-42	blank
43-71	same as columns 12 to 40
72-76	blank
77-80	beginning and ending months for the year or standard period; columns 77-78 contain the month "from", e.g., 03 for March, and columns 79-80 contain the month "to", e.g., 10 for October.

Note 1. Description of Data Fields:

Each data field has nine positions (columns 19-27 and 32-40). The first eight positions contain the discharge, right-justified, with a decimal point if necessary; the ninth position contains a symbol:

A - Manual Gauge, B - Ice Conditions (discharges only), E - Estimated, R - Revised within the last two years, S - Revised (and Manual Gauge), T - Revised (and Ice Conditions - discharge only), W - Revised (and Estimated), or a blank for no symbol. A negative value is entered with a minus sign just to the left of the number, e.g., -12.3 or -0.012. The maximum and/or minimum daily values are also given for incomplete years if considered valid for the entire year (or standard period) even though some daily values are missing. If only the maximum or minimum is valid, then the field for the non-valid extreme is blank. When two or more values are the same within a year, the date of first occurrence is given.

Note 2. Annual Maximum and Minimum Daily Mean Figures:

Two years of annual daily mean extremes for a station are written onto one record. If there is only one year to be written, the second maximum and minimum daily values (columns 43-71) are blank.

Discharge

Monthly And Annual Mean (Format 79-102)

This retrieval produces card images (records) of the monthly and annual mean discharges in 79-102 format as follows:

Column(s)	Description
1	code for type of units: 1 - mean discharges in cubic metres per second
2-8	station number, e.g., 08AA023
9-11	year, e.g., 986 for 1986
12-13	beginning month for data in columns 15-50, i.e., either 01 for January or 07 for July
14	code for type of data: 4 - monthly and annual figures
15-50	6 six-character data fields (used for monthly figures only)
51-80	refer to notes 1 and 2

Note 1. Description of Data Fields:

Each data field has six positions. The first five positions contain monthly mean discharges, right-justified, with a decimal point if necessary; the sixth position may contain the symbol R to indicate that at least one daily value in the month has been revised, added or corrected within the last two years, or it contains a blank for no revision. A negative value is entered with a minus sign just to the left of the number, e.g., -12.3 or -0.001. The successive fields are for consecutive months. The value -9999 is entered in positions 1-5 whenever a figure is missing in a field that would normally contain a figure, and position 6 contains a blank.

Note 2. Monthly and Annual Mean Figures:

Data for each year on file are written onto two records. The first record contains six monthly means in columns 15-50, starting with January as indicated in columns 12-13; columns 51-76 are blank; columns 77-80 contain the beginning and ending months for the year or standard period. The second record contains six monthly means in columns 15-50, starting with July as indicated in columns 12-13; columns 51-74 are blank; columns 75-79 contain the mean for the year or standard period, right-justified; column 80 contains the symbol R or is blank.

Levels

Daily Mean (Format 79-042)

This retrieval produces four card images (records) per month for daily water levels in 79-042 format as follows:

Column(s)	Description
1	code for type of data and units: 8 - daily water levels in millimetres 9 - daily water levels in centimetres
2-8	station number, e.g., 08AA023
9-11	year, e.g., 986 for 1986
12-13	month, e.g., 07 for July
14	code for time interval: 1 - daily figures from day 1 to day 8 2 - daily figures from day 9 to day 16 3 - daily figures from day 17 to day 24 4 - daily figures from day 25 to day 31
15-16	number of days in the month, i.e., either 28, 29, 30 or 31
17-80	6, 7 or 8 eight-character data fields; refer to notes 1 and 2

Note 1. Description of Data Fields:

Each data field has eight positions. The first seven positions contain daily water level data, right-justified, with no decimal point; the eighth position contains a symbol:

A - Manual Gauge, E - Estimated, D - Dry, R - Revised within the last two years, S - Revised (and Manual Gauge), W - Revised (and Estimated), V - Revised (and Dry), or a blank for no symbol. If position 8 contains the symbol D, then positions 1-7 in the associated data field contain blanks. A negative value is entered with a minus sign just to the left of the number, e.g., -13131. The first data field is in columns 17-24. The successive fields are for consecutive days depending on the interval (column 14) used. Whenever data are missing, the value -999999 is entered in positions 1-7, and position 8 contains a blank.

Note 2. Daily Figures:

Daily water levels for each month on file are written onto four records. The first three records contain data for days 1 to 24 (8 days per record). The fourth record (4 in column 14) contains data for days 25 to 31 in columns 17-72. Whenever days 29, 30 or 31 are not applicable to the month, e.g., 31 for November, positions 1-7 of the fields in question contain -111111 and position 8 contains a blank; columns 73-85 are blank; columns 76-78 contain a code for the name of the gauge datum.

Levels

Extreme Instantaneous (Format 79-101)

This retrieval produces card images (records) of annual maximum instantaneous peak water levels in 79-101 format as follows:

Column(s)	Description
1	code for type of data and units: 8 - water levels in metres (to millimetres) 9 - water levels in metres (to centimetres)
2	blank
3-9	station number, e.g., 04AA001
10	blank
11-13	year, e.g., 986 for 1986
14-15	month, e.g., 03 for March
16-17	day, e.g., 02 or 27
18-21	time of day, using the 24-hour clock, e.g., 0323 for 3:23 a.m.
22-23	time zone, e.g., ES for Eastern Standard Time
24-32	maximum instantaneous water level, right-justified, with a decimal point if necessary
33-54	same as columns 11 to 32 above
55-76	same as columns 11 to 32 above
77	blank
78-80	three-digit code, right-justified, for the name of the gauge datum (for water levels only)

Note 1. Description of Data Fields:

Each data field has twenty-two positions. The first thirteen positions contain the date and time of occurrence. The water level is entered in the next eight positions, right justified with a decimal point if necessary. The twenty-second position contains a symbol:

A - Manual Gauge, E -Estimated, R - Revised within the last two years, S - Revised (and Manual Gauge), W - Revised (and Estimated), or a blank for no symbol. The successive fields are for the next available figure and may not be the following year if a figure is not available for that year.

Note 2. Annual Maximum Instantaneous Figures:

Three instantaneous water levels are written per record together with their respective year, month, day, time of day and time zone. Only the year with data available are written. All the records for any one station will each have three instantaneous water levels except possibly the last one, which may have only one or two. The month, day, time of day, or time zone or any combination of these may not be available in some cases, therefore, the associated field would be left blank.

Levels

Extreme Daily (Format 79-113)

This retrieval produces card images (records) of annual maximum and minimum daily water levels in 79-113 format as follows:

Column(s)	Description
1	code for type of data and units: 8 - water levels in metres (to millimetres) 9 - water levels in metres (to centimetres)
2	blank
3-9	station number, e.g., 05AB003
10-11	blank
12-14	year, e.g., 986 for 1986
15-16	month in which maximum occurred, e.g., 06 for June
17-18	day, e.g., 07 or 27
19-27	annual maximum daily mean, right-justified, with decimal point if necessary, and symbol
28-29	month in which minimum occurred, e.g., 10 for October
30-31	day, e.g., 07 or 31
32-40	annual minimum daily mean, right-justified, with decimal point if necessary, and symbol
41-42	blank
43-71	same as columns 12 to 40
72-74	three-digit code for the name of the gauge datum (for water levels only); the names of the gauge datum are listed along with the period-of-record summary
75-76	blank
77-80	beginning and ending months for the year: columns 77-78 contain the month "from", e.g., 03 for March and columns 79-80 contain the month "to", e.g., 10 for October.

Note 1. Description of Data Fields:

Each data field has nine positions (columns 19-27 and 32-40). The first eight positions contain the water level, right-justified, with a decimal point if necessary; the ninth position contains a symbol:

A - Manual Gauge, E - Estimated, D - Dry (water levels only), R - Revised within the last two years, S - Revised (and Manual Gauge), W - Revised (and Estimated), V - Revised (and Dry - water levels only), or a blank for no symbol. If position 9 contains the symbol D, then positions 1-8 in the associated data field contain blanks. A negative value is entered with a minus sign just to the left of the number, e.g., -12.30 or -0.012. The maximum and/or minimum daily values are also given for incomplete years if considered valid for the entire year even though some daily values are missing. If only the maximum or minimum is valid, then the field for the non-valid extreme is blank. When two or more values are the same within a year, the date of first occurrence is given.

Note 2. Annual Maximum and Minimum Daily Mean Figures:

Two years of annual daily mean extremes for a station are written onto one record. If there is only one year to be written, the second maximum and minimum daily values (columns 43-71) are blank.

Levels

Monthly And Annual Mean (Format 79-117)

This retrieval produces card images (records) of the monthly and annual mean water levels in 79-117 format as follows:

Column(s)	Description
1	code for type of units: 8 - water levels in metres (to millimetres) 9 - water levels in metres (to centimetres)
2-8	station number, e.g., 08AA023
9-11	year, e.g., 986 for 1986
12-13	beginning month for data in columns 15-68, i.e., either 01 for January or 07 for July
14	code for type of data: 4 - monthly and annual figures
15-68	6 nine-character data fields (used for monthly figures only)
69-78	refer to notes 1 and 2

Note 1. Description of Data Fields:

Each data field has nine positions. The first eight positions contain the monthly mean water level, right-justified, with a decimal point; the ninth position may contain the symbol R to indicate that at least one daily value in the month has been revised, added or corrected within the last two years, or it contains a blank for no revision. A negative value is entered with a minus sign just to the left of the number, e.g., -12.30 or -0.001. The successive fields are for consecutive months. The value -9999999 is entered in positions 1-8 whenever a figure is missing in a field that would normally contain a figure, and position 9 contains a blank. If a month has complete data and the water level for every day is dry (D), then position 1- 8 are blank and position 9 contains a D. If a month has complete data and the water level for some days are dry (D), then positions 1-8 are blank and position 9 contains a P (partially dry).

Note 2. Monthly and Annual Mean Figures:

Data for each year of file are written onto two records. The first record contains six monthly means in columns 15-68, starting with January as indicated in columns 12-13; columns 69-77 are blank; columns 78-80 contain the datum code. The second record contains six monthly means in columns 15-68, starting with July as indicated in columns 12-13; columns 69-71 are blank; columns 72-79 contain the mean for the year, right-justified; column 80 contains the symbol R or is blank.

Suspended Sediment Concentration

Daily Mean (Format 79-100)

This retrieval produces three card images (records) per month for daily mean suspended sediment concentrations in 79-100 format as follows:

Column(s)	Description
1	code for type of data and units: 7 - daily mean suspended sediment concentration in mg/L
2-8	station number, e.g., 08AA023
9-11	year, e.g., 986 for 1986
12-13	month, e.g., 07 for July
14	code for time interval: 1 - daily figures from day 1 to day 10 2 - daily figures from day 11 to day 20 3 - daily figures from day 21 to day 31
15-80	10 or 11 six-digit data fields; refer to notes 1 and 2.

Note 1. Description of Data Fields:

Each data field has six positions. The first five positions contain daily suspended sediment concentration data, right-justified, with no decimal point; the sixth position may contain a symbol:

E - Estimated, S - Sample(s) collected this day, R - Revised within the last two years, W - Revised (and Estimated), Z - Revised (and Sample(s) collected this day), or a blank for no symbol. The first data field is in columns 15-20. The successive fields are for consecutive days. Whenever data for any day are missing, the value -9999 is entered in positions 1-5, and position 6 contains a blank.

Note 2. Daily Figures:

Data for each month on file are entered on three records. The first record (1 in column 14) contains data for 10 days from day 1 to day 10; columns 75-78 are not used; the number of days in the month, e.g., 30 for November, is entered in columns 79-80. The second record (2 in column 14) contains 10 days from day 11 to day 20; columns 75-80 are not used. The third record (3 in column 14) contains 11 days from day 21 to day 31; the figure - 11111 is entered in the appropriate field for days that do not apply to the month, e.g., 30 and 31 for February 1984.

Suspended Sediment Load

Daily Mean (Format 83-100)

This retrieval produces three card images (records) per month for the daily suspended sediment load in TONNES in 83-100 format as follows:

Column(s)	Description
1	code for type of data and units T - daily suspended sediment load in TONNES
2-8	station number, e.g. 08AA023
9-11	year, e.g. 968 for 1968
12-13	month, e.g. b7 for July
14	code for time interval: 1 - daily figures from day 1 to day 10 2 - daily figures from day 11 to day 20 3 - daily figures from day 21 to day 31
15-80	ten or eleven 6-character data fields; refer to Notes 1 and 2.

Note 1. Description of Data Fields

Each data field has six positions. The first five positions contain the three significant figures for the daily suspended sediment load right justified with no decimal. The sixth position contains an integer number which is used in the following equation to get the correct load:

$$T = V \times 10^{(I-3)}$$

where

T = daily suspended sediment load in Tonnes.

V = value in the first five positions of the data field.

I = value in the sixth position of the data field.

e.g. If the first five positions contain bb123 and the sixth position contains a 4 the daily suspended load would be 1230.

The first data field is in columns 15-20. The successive fields are for consecutive days depending on the time interval (column 14) used. Whenever data are missing, the value -9999 is entered in positions 1-5 and position 6 contains a blank.

Note 2. Daily Figures:

Daily suspended sediment load for each month on file are entered on three records. The first record (1 in column 14) contains data for 10 days from day 1 to 10; columns 75-78 are not used; the number of days in the month, e.g. 30 for November, is entered in columns 79-80. The second record (2 in column 14) contains 10 days from day 11 to 20; columns 75-80 are not used. The third record (3 in column 14) contains 11 days from day 21 to 31; the value -1111 is entered in positions 1 to 5 for days that do not apply to the month, e.g. 31 for November, and position 6 contains a blank.

Sediment

Instantaneous User Format

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Position 1-2 2 Letters In Positions 3-4 3 Digits In Position 5-7
8-9	2	Data Type	"DI" - Depth Integrating "SV" - Split Vertical Depth Integrating "PI" - Point Integrating "BL" - Bedload "BM" - Bed Material
10-13	4	Year	Year (4 Digits)
14-15	2	Month	Month (2 Digits) e.g. "01" For January
16-17	2	Day	Day (2 Digits)
18-21	4	Time	Hours & Minutes On A 24 Hour Clock, e.g. 1330 For 1 Hour 30 Minutes p.m.
22	1	Time Symbol	Blank, "E" (Estimated)
23-30	8	Discharge	In Cubic Metres Per Second, With Up To Three Decimal Places
31	1	Discharge Symbol	Blank "A", "B" Or "E"
32-35	4	Sampling Vertical	Alpha/Numeric; See Note 1; If Less Than 100 Metres, One Decimal, Left Justified
36	1	Sampling Vertical	Blank "K", "L", "M", "X" Or "Z" Symbol
37-40	4	Temperature	In Celsius Degrees, To One Decimal
41-45	5	Concentration	In Mg/L No Decimal, Right Justified
46	1	Conc. Symbol	Blank, "B", "C", "F", "G" Or "T". Notes: Some "R" And "K" Symbols May Also Exist From Old Part Size Converted Data
47-50	4	Dissolved Solids	In mg/l; No Decimal; Right Justified
51-55	5	Type Of Sampler	Alpha/Numeric; Left Justified; See Note 2
56-57	2	Blank	
58-61	4	Depth Of Sample	In Metres To One Or Two Decimal Places Right Justified(For Point Integrating)
62-65	4	Depth1	In Metres To One Or Two Decimal Places Right Justified(For Split Vertical Depth Integrating)
66-69	4	Depth2	In metres to one or two decimal places right justified (for split vertical depth integrating)
70-71	2	Streambed code	Blank or "SB" to indicate streambed record
72	1	Messages	Message code; See Note 3
73-74	2	Blank	
75-77	3	Percentage	% For Particle Size 0.002 mm (Note 4)
78-80	3	Percentage	% For Particle Size 0.004 mm
81-83	3	Percentage	% For Particle Size 0.008 mm
84-86	3	Percentage	% For Particle Size 0.016 mm
87-89	3	Percentage	% For Particle Size 0.031 mm

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
90-92	3	Percentage	% For Particle Size 0.062 mm
93-95	3	Percentage	% For Particle Size 0.125 mm
96-98	3	Percentage	% For Particle Size 0.250 mm
99-101	3	Percentage	% For Particle Size 0.500 mm
102-104	3	Percentage	% For Particle Size 1.0 mm
105-107	3	Percentage	% For Particle Size 2.0 mm
108-110	3	Percentage	% For Particle Size 4.0 mm
111-113	3	Percentage	% For Particle Size 8.0 mm
114-116	3	Percentage	% For Particle Size 16.0 mm
117-119	3	Percentage	% For Particle Size 32.0 mm
120-122	3	Percentage	% For Particle Size 64.0 mm
123-125	3	Percentage	% For Particle Size 128 mm
126-128	3	Percentage	% For Particle Size 256 mm
129-131	3	Percentage	% For Particle Size 512 mm

NOTE 1: Sampling vertical is a left justified 4 character field which may contain the following:

Numeric value with up to one place after the decimal point, left justified; or one of the following symbols:

"MULT", "WERB", "WELB", "IQLB", "IQRB", "3QRB", "3QLB", "MID" OR "-" "HWRB", "WERB", "IWELB", "HWLB", "-" (for bed material)

NOTE 2: Sampler type is a 5 character left justified field which may contain one of the following:

For depth integrating data (DI) or split vertical data (SV): "DH48", "DH59", "DIP", "D49", "D74", "D77", "F61", "P63", "P72", "PWS", "PS82", "PUMP", "SURF", "-"

For point integrating data (PI): "P61", "P63", "P72", "PWS", "PS82", "PUMP", "SURF", "-"

For bedload data (BL): "ARN", "BAS", "BOG", "SON", "VUV", "PIT", "VOR", "OTH", "-"

For bed material data (EM): "BM54", "BMH53", "BMH60", "CLAMP", "CORE", "LANE", "SCOOP", "SHIP" FOR SHIPEK, "-"

NOTE 3: The following messages may be indicated:

For point integrating data

"1" data not available

"2" sample destroyed

"3" sample combined with depth below

For bedload data or bed material data

"4" no material collected

"5" sample combined with vertical below

"6" sample combined with vertical above

NOTE 4: The percentage fields are made up of 19 three-character fields beginning in column 75 which may contain the percentage (1-100) for which a sample has been analyzed for particle size.

The percentage finer than each particle size is stored in a specific position. The following particle sizes (in mm) are valid:

0.002, 0.004, 0.008, 0.016, 0.031, 0.062, 0.125, 0.250, 0.500, 1.0, 2.0, 4.0, 8.0, 16.0, 32.0, 64.0, 128, 256, 512.

HYDEX

Header

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8-77	70	Station Name	Alpha/Numeric
78	1	International	Code "Y" - Yes, "N" - No
79-85	7	Latitude	Latitude - 6 Or 7 Numbers (7th No. Is A Decimal Second)
86-93	8	Longitude	Longitude - 7 Or 8 Numbers (8th No. Is A Decimal Second)
94-107	14	Legal Land Desc.	Alpha/Numeric
108	1	Region	Region Code; See Region File
109-110	2	Prov./Terr./State	Province/State Code (Location); See Province-Territory Or State File
111	1	Country	Country Code C - Canada, U - United States
112-120	9	Drainage Area Gross	Numeric
121-129	9	Drainage Area Effective	Numeric
130	1	Remote Access	Remote Access - "Y"/"N"
131-132	2	Prov. Published	Province Code Where Data Published See Prov/State
133-135	3	Datum Id. 1	Datum Code; See Datum File
136	1	Datum Type 1	Datum Type Code 1 - Local Datum, 2 - Official Datum, 3 - Other Datum
137-139	3	Datum Id. 2	Datum Code; See Datum File
140	1	Datum Type 2	Datum Type Code 1 - Local Datum, 2 - Official Datum, 3 - Other Datum
141-143	3	Datum Id. From 1)	Datum Code; See Datum File
144-146	3	Datum Id. To (2)	Datum Code; See Datum File
147-153	7	Conver. Factor	Conversion Factor - Numeric
154-170	17	Datum Conver. 2	Second Datum Conversion; As In Cols. 137-153
171-173	3	Unrel Datum Id. 1	Unrelated Datum Code; See Datum File
174-181	8	Period From 1	Date - Yyyy-Mm-Dd
182-189	8	Period To 1	Date - Yyyy-Mm-Dd
190-208	19	Unrel Datum 2	Second Unrelated Datum As In Cols. 171-189
209-227	19	Unrel Datum 3	Third Unrelated Datum As In Cols. 171-189
228	1	Sed. Program Type	Sediment Program Type Code M - Miscellaneous, R - Regular
229-240	12	Sed. Sample No.	Sediment Sample Number Alpha/Numeric

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
241-245	5	Sed. Samp. Vert.	Sediment Sampling Vertical Code MULT - Composite Sed. Measurement WELB - Waters Edge Left Bank 1QLB - One-Quarter The Distance From The Left Bank 3QRB - Three Quarters Fr Right Bank MID - Mid Stream 3QLB - Three-Quarters Fr Left Bank 1QRB - One-Quarter Fr Right Bank WERB - Waters Edge Right Bank - Unknown Number Value (One Decimal)

HYDEX

Remarks

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8-9	2	Remarks Type	Remarks Type Code 01 - General Remarks 02 - Comments On Sediment Stations 11 - Station Location Description
10-12	3	Remarks Seqno	Remarks Sequence Number; See Note 1
13-86	74	Remarks	Remarks; See Note 1

NOTE 1: The Sequence Number Is A Three-Digit Number From 001 To 999, So There Can Be Up To 999 Lines Of Description For Any One Remark.

Columns 8-86 Can Be Repeated Many Times For Each Station, Depending Upon The Number Of Remarks Types And The Length Of The Remark.

HYDEX

Operation

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8-12	5	Tributary Id. 1	Tributary Id. Code See Tributary File
13	1	Trib. Assoc. 1	Tributary Association Code 2 - Tributary From 3 - Tributary On
14-19	6	Trib. Id./Assoc 2	Second Tributary & Assoc. As In Cols. 8-13
20-25	6	Trib. Id/Assoc 3	Third Tributary & Assoc.
26	1	Data Coll. Type 1	Data Collection Type Code H - Hydrometric M - Monthly Means Only R - Reservoir Contents S - Sediment T - Water Temperature W - Water Quality
27	1	Data Coll. Stat 1	Status Of Data Collection Type 1 A - Active D - Discontinued
28-29	2	Data Coll. 2	Data Collection Type/Status As In Cols. 26-27
30-31	2	Data Coll. 3	Data Collection Type/Status As In Cols. 26-27
32-33	2	Data Coll. 4	Data Collection Type/Status As In Cols. 26-27
34-35	2	Data Coll. 5	Data Collection Type/Status As In Cols. 26-27
36-45	10	Benchmark Id.	Master Benchmark Id Alpha/Numeric.
46-53	8	Benchmark Elev.	Benchmark Elevation - Numeric
54-60	7	Map Identifier	Map Number
61-63	3	Hydrometric Oper.	Agency Code For Operating Agency; See Agency File
64-66	3	Hydrometric Cost	Agency Code For Costing Agency; See Agency File
67-69	3	Sediment Oper.	Agency Code For Operating Agency; See Agency File
70-72	3	Sediment Cost.	Agency Code For Costing Agency; See Agency File
73-75	3	Hyd. Curr. Oper Start Month	Start Month - E.G. "Jan."
76-78	3	Hyd. Curr. Oper End Month	End Month - E.G. "Dec."
79-81	3	Hyd. Ann. Publ Start Month	Start Month - E.G. "Jan."
82-84	3	Hyd. Ann. Publ End Month	End Month - E.G. "Dec."
85-87	3	Hyd. Hist. Publ Start Month	Start Month - E.G. "Jan."
88-90	3	Hyd. Hist. Publ End Month	End Month - E.G. "Dec."
91-93	3	Sed. Curr. Oper Start Month	Start Month - E.G. "Jan."

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
94-96	3	Sed. Curr. Oper End Month	End Month - E.G. "Dec."
97-99	3	Sed. Ann. Publ Start Month	Start Month - E.G. "Jan."
100-102	3	Sed. Ann. Publ End Month	End Month - E.G. "Dec."
103-105	3	Sed. Hist. Publ Start Month	Start Month - E.G. "Jan."
106-108	3	Sed. Hist. Publ End Month	End Month - E.G. "Dec."
109-112	4	Reg. Begin 1	Year Regulation Begins; See Note1
113-116	4	Reg. End 1	Year Regulation Ends; See Note 1
117	1	Reg. Type 1	Regulation Type Code N - Natural R - Regulated (See Note 1)
118-120	3	Reg. Deg. 1	Degree Of Regulation; See Note 1 0 - 100% (0% For Natural)

NOTE 1: Columns 109-120 Can Occur Many Times Depending Upon The Number Of Changes In The Status Of The Regulation.

HYDEX

Hydrometric Records

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8	1	Hydrometric Type	Hydrometric Type Code H - Water Level Q - Discharge
9-12	4	Begin Year	Beginning Year For Hydrometric Data
13-16	4	End Year	End Year For Hydrometric Data
17	1	Gauge Type	Gauge Type Code M - Manual Gauge P - Power Plant R - Recorder S - Summation Of Flow
18	1	Operation Sched.	Operation Schedule Code C - Continuous M - Miscellaneous S - Seasonal

NOTE 1: There Can Be An Indefinite Number Of Periods For Which Hydrometric Data Have Been Collected, With Appropriate Gauge Type And Operation Schedule.

Columns 8-18 Can Therefore Be Repeated Many Times For Each Station, Depending Upon The Number Of Periods.

HYDEX

Sediment Records

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8	1	Sed. Record Type	Sediment Record Type Code I - Instantaneous T - Tonnes
9-12	4	Sediment Year	Year For Sediment Data
13-14	2	Sed. Data Type	Sediment Data Type Code DI - Depth Integrating- Part. Size PI - Point Integrating- Part. Size BP - Bed Load- Particle Size ET - Bed Load - Tonnes EM - Bed Material- Particle Size DS - Dissolved Solids WT - Water Temperature
15	1	Sampling Method	Sampling Method Code A - Automatic M - Manual B - Both
16	1	Operation Sched.	Sediment Operation Schedule Code C - Continuous M - Miscellaneous S - Seasonal

NOTE 1: There Can Be An Indefinite Number Of Years For Which Sediment Data Have Been Collected, And Many Types Of Data Collected Each Year.

Columns 8-16 Can Therefore Be Repeated Many Times For Each Station, Depending Upon The Number Of Records.

HYDEX

Review

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8	1	Review Type	Review Type Code H - Hydrometric S - Sediment
9-12	4	Review Begin 1	Year Review Begins
13-16	4	Review End 1	Year Review Ends
17-24	8	Review Date 1	Date Of Review (Yyyy-Mm-Dd)
25-54	30	Review By1	Name Of Person Conducting Review
55-57	3	Review Seqno.	Numeric; See Note 1
58-131	74	Review Text	Alpha/Numeric; See Note 1

NOTE 1: The Sequence Number Is A Three-Digit Number From 001-999, So There Can Be Up To 999 Lines Of Review Text For Any One Review.

Columns 55-131 Can Therefore Be Repeated Many Times For Each Station, Depending Upon The Number Of Review Text Lines.

NOTE 2: Columns 1-131 Can Occur Many Times Depending Upon The Number Of Reviews Conducted (Identified By "Review Type" And "Begin Year").

HYDEX

Station Equipment

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
1-7	7	Station No.	2 Digits In Positions 1-2 2 Letters In Positions 3-4 3 Digits In Positions 5-7
8-9	2	Manual Gauge 1	Manual Gauge Type Code 01 - Staff 02 - Cantilever 03 - Wire Weight 04 - Crest Stage 05 - Slope 06 - Bench Mark 07 - Reference Point 08 - Electric Contact (Tape) 09 - Chain 10 - Hook 11 - Indicator 12 - Valve Setting 99 - Other
10-11	2	Manual Gauge 2	Second Manual Gauge Code
12-13	2	Manual Gauge 3	Third Manual Gauge Code
14-15	2	Rec. Gauge Type 1	Recorder Gauge Type Code 01 - Stevens Type A 02 - Stevens Type F 03 - Ott 04 - Fisher And Porter (Punch) 05 - Stevens (Punch) 06 - Winnipeg Type Curved-Line 10 - Scientific Instruments 11 - Cae Aircraft 20 - Statham 21 - Sherlock 30 - Foxboro 99 - Other
16	1	Recorder Id. 1a	Numeric
17-18	2	Sensor Type 1a	Sensor Type Code 01 - Float (Well) 02 - Pressure System
19	1	Pressure Type 1a	Pressure Type Code 1 - Gas Purge 2 - Diaphragm
20	1	Interface 1a	Interface Type Code 1 - Servo-Manometer 2 - Servo-Beam-Balance 3 - Bellows 4 - Edas (Electronic Data Acquisition System)
21	1	Recorder Id. 1b	Numeric
22-23	2	Sensor Type 1b	Sensor Type Code
24	1	Pressure Type 1b	Pressure Type Code
25	1	Interface 1b	Interface Type Code
26-27	2	Rec. Gauge Type 2	Recorder Gauge Type Code

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
28	1	Recorder Id.	Numeric
29-30	2	Sensor Type 2a	Sensor Type Code
31	1	Pressure Type 2a	Pressure Type Code
32	1	Interface 2a	Interface Type Code
33	1	Recorder Id. 2b	Numeric
34-35	2	Sensor Type 2b	Sensor Type Code
36	1	Pressure Type 2b	Pressure Type Code
37	1	Interface 2b	Interface Type Code
38	1	Telemetry Id. 1	Numeric
39	1	Telemetry Type 1	Telemetry Type Code 1 - Telephone - Audio 2 - Telephone - Digital 3 - Radio 4 - Satellite (DCP) 5 - Manual Data Entry
40-41	2	Telemetry Make 1	Telemetry Make Code 01 - Ball Brothers 02 - Bristol 03 - Bristol Hydromet 04 - Handar 05 - Labarge 06 - Magnavox 07 - Sutron 08 - Synergetics 99 - Other
42-43	2	Tel. Data Type 1a	Telemetry Data Type Code HG - Height, River Stage IM - Ice Movement (Iceout) PC - Prec., Accumulator PR - Prec. Rate (Rain-Tipping Buck) QR - Discharge, River RI - Radiation, Incoming Solar TA - Temperature, Air (Ambient) TW - Temperature, Water TY - Temperature Surface (DCP) WD - Wind Direction WS - Wind Speed VB - Voltage Battery WH - Water, Dissolved Hydr. Sulfide WQ - Water, Quality WV - Water, Velocity XR - Humidity, Relative ZA - Recorder Clock ZB - Nitrogen Tank Pressure ZC - Sampling Operation ZD - Door Opening Counter ZE - Emergency Signal Generator ZZ - Other
44-45	2	Tel. Data Type 1b	Telemetry Data Type Code
46-47	2	Tel. Data Type 1c	Telemetry Data Type Code
48-49	2	Tel. Data Type 1d	Telemetry Data Type Code
50-51	2	Tel. Data Type 1e	Telemetry Data Type Code
52-53	2	Tel. Data Type 1f	Telemetry Data Type Code
54	1	Telemetry Id. 2	Numeric
55	1	Telemetry Type 2	Telemetry Type Code
56-57	2	Telemetry Make 2	Telemetry Make Code

COLUMN(S)	LENGTH	FIELD	DESCRIPTION
58-59	2	Tel. Data Type 2a	Telemetry Data Type Code
60-61	2	Tel. Data Type 2b	Telemetry Data Type Code
62-63	2	Tel. Data Type 2c	Telemetry Data Type Code
64-65	2	Tel. Data Type 2d	Telemetry Data Type Code
66-67	2	Tel. Data Type 2e	Telemetry Data Type Code
68-69	2	Tel. Data Type 2f	Telemetry Data Type Code

BINARY FORMAT

CANADIAN

struct daily-flows_and_levels_str

		Offset	Length	
char	station_number[7];	0	7	2 digit, 2 letter, 3 digits
int	parameter;	7	2	1 = discharge, 2 = level
int	year;	9	2	year, no bias 1908=1908
float	daily_values[12][31];	11	1488	array of discharges or levels
char	[12][31];	1499	372	flags for daily_values

BINARY FORMAT

USGS

The USGS binary format contains no flags but more header information than Canadian binary. It was created in order that certain ancillary programs such as Durfreq and fffreq operate against the Canadian data. However, to a certain extent it is a square peg in a round hole; there is no Canadian analog to many of the fields in USGS binary records. For instance, sample cross section location is not present in Canadian data. Our suggestion is that you examine the information in the Canadian binary format and the Hydrex format descriptions below. If those formats do not provide for delivering a certain type of information, then it should probably not be relied upon in the USGS binary exports.

Variable types are:

Char

Characters are 8-bit (1-byte) values usually containing an ASCII code for a character. Valid numeric values representing chars are 0 - 255.

Int

Integer values are 16-bit, 2s-complement numbers. The least significant byte has the lower offset.

Long

Long integer values are 32-bit 2s-complement numbers. The least significant byte has the lower offset; the more significant bytes are at increasing offset.

Float

Floating point (real) numbers use the IEEE standard representation for 4-byte real numbers. They have a sign bit, 8-bit excess-127 binary exponent, and a 24-bit mantissa. The mantissa represents a number between 1.0 and 2.0. The high-order bit of the mantissa for numbers in this range is always 1; it is implied and not stored in the number. A number with an exponent of all zeros represents zero.

Array

Arrays are composed of the base type stored in column-major order. The leftmost index changes most rapidly as a multi-dimensional array is mapped into a one-dimensional array.

Structures

Structures are composed of the component types in order of declaration with no padding except as declared.

Daily Values

Variable type	Record name	Offset	Length
char	blank1 [2]	0	2
char	state [2]	2	2
char	agency[5]	4	5
char	id[15]	9	15
float	sample_xsecloc	24	4
float	sample_depth	28	4
long	parameter	32	4
int	year	36	2
int	statistic	38	2
float	novalue_mark	40	4
float	flows[12][3 1]	44	1488
char	blank2[3]	1532	3
char	agency_office[2]	1535	2
char	county[3]	1537	3
char	staname[48]	1540	48
float	drain_area	1588	4
float	cont_area	1592	4
float	well_depth	1596	4
char	datum[4]	1600	4
long	hydro_unit	1604	4

int	retrieval	1608	2
int	start_month	1610	2
char	sitecode[2]	1612	2
char	latitude[6]	1614	6
char	longitude[7]	1620	7
char	seqnum[2]	1627	2
char	geo-unit[8]	1629	8
char	blank3 [2]	1637	2
char	aquifer[1]	1639	1
char	blank4[9]	1640	9
char	blank5 [7]	1649	7

Extreme Values

struct extreme_header_str

Variable type	Record name	Offset	Length
long	header_length;	0	4
char	blank1;	4	1
char	blank1;	4	1
char	char1;	5	1
char	agency[5];	6	5
char	id[15];	11	15
char	latitude[6];	26	6
char	longitude[7];	32	7
char	seqnum[2];	39	2
char	state[2];	41	2
char	agency_office[2];	43	2
char	county[3];	45	3
char	site1[2];	48	2
char	site2[2];	50	2
char	site3[2];	52	2
int	mon_day;	54	2
char	staname[48];	56	48
char	geo_unit[8];	104	8
char	aquifer;	112	1
char	blank4[9];	113	9
int	year	122	2
long	hydro_unit	124	4
float	drain_area;	128	4
float	cont_area;	132	4
char	datum[4];	136	4
float	well_depth;	140	4
char	blankS[8];	144	8
float	base_flow	152	4

struct extreme_value_str

Variable type	Record name	Offset	Length	
long	len;	4		length of structure
char	blank;	1		reserved
char	charp;	5	1	always a p
char	agency[5];	6	5	agency code
char	id[15];	11	15	15 digit station number
int	year;	26	2	water year for given extreme
float	extreme_flow;	28	4	the extreme flow
char	extreme_stage[4];	32	4	the stage at extreme flow
char	extr_stage_codes;	36	1	stage qualifying codes
int	extr_flow_codes;	37	2	extreme flows qualifying codes
char	security;	39	1	security byte
char	extreme_day[2];	40	2	day of extreme flow
char	extreme_month[2];	42	2	month of extreme flow
int	num_ann_stages;	44	22	number of extreme stages
int	num_artia_extr;	46	2	number of partial extremes
char	blank2[4];	48	4	reserved
char	create_date[4];	52	4	record creation date
char	process_date[4];	56	4	record processing date
char	district [2];	60	2	district responsible
int	highest_since;	62	2	highest year ever
char	blank[8];	64	8	reserved

COMMA AND BLANK SEPARATED VALUES FORMAT

Comma and Blank Separated value exports are available for Summary, Daily, Extreme, Mean, and Sediment Summary reports. Both formats preserve the row, column format of each display window by including column headers and separating each column with commas and blanks respectively which can then be imported directly into your chosen spreadsheet application.

Summary

The summary export consists of 10 rows and 16 columns of data. The first row includes column headers for:

ID	the station number (i.e. 04AA001)
PARAM	HYDAT parameter (i.e. 1 = flow)
STATISTIC	type of summary statistic (i.e. D Cnt, Mean, etc.)
JAN - ANN	month of record

Daily

The daily export consists of 31 rows and 29 columns for each year in the period of record. There is also a column header row at the beginning which identifies:

ID	station number (i.e. 04AA001)
PARAM	HYDAT parameter (i.e. 1 = flow)
TYPE	type of data and units of measurement (i.e. 1 = discharge in cubic metres per second)
YEAR	year of record (i.e. 1994)
DD	day of the month (i.e. 02 or 24)
JAN - DEC	month of record
SYM	daily and extreme code (i.e. A = manual gauge)

Extreme

The extreme export consists of 14 columns with the number of rows varying according to the number of years in the period of record. The first row provides header information for the 14 columns and includes:

ID	station number (i.e. 04AA001)
PARAM	HYDAT parameter (i.e. 1 = flow)
YEAR	year of record (i.e.. 1994)
I-MAX	instantaneous maximum
SYM	daily and extreme code (i.e. A = manual gauge)
HH:MM	time of measurement (i.e. 17:00)
CODE	time zone (i.e. ES for Eastern Standard Time)
MM-DD	month and day on which instantaneous maximum occurred (i.e. 08-02)
MAX	annual maximum daily mean
SYM	daily and extreme code (i.e. A = manual gauge)
MM-DD	month and day on which maximum occurred (i.e. 08-02)
MIN	annual minimum daily mean
SYM	daily and extreme code (i.e. A = manual gauge)
MM-DD	month and day on which minimum occurred (i.e. 08-02)

Mean

The mean export consists of 30 columns with the number of rows varying according to the number of years in the period of record. The first row provides header information for the 30 columns and includes:

ID	station number (i.e. 04AA001)
PARAM	HYDAT parameter (i.e. 1 = flow)
TYPE	type of data and units of measurement (i.e. 1 = discharge in cubic metres per second)
YEAR	year of record (i.e. 1994)
JAN - ANN	month of record
SYM	daily and extreme code (i.e. A = manual gauge)

Sediment Summary

The sediment summary export consists of 14 columns with the number of rows varying according to the number of years in the period of record. The first row provides header information for the 14 columns and includes:

ID	station number (i.e. 04AA001)
YEAR	year of record (i.e. 1994)
JFMAMJJASOND	period of operation summary (i.e. “-” = no data, “P” = incomplete month of data, “C” = complete month of data)

SAMPLING	sampling method used to collect data (i.e. manual)
MAX	maximum daily value
MM-DD	month and day on which maximum occurred (i.e. 08-02)
MIN	minimum daily value
MM-DD	month and day on which minimum occurred (i.e. 08-02)
MAX-T	maximum daily load
MM-DD	month and day on which maximum load occurred (i.e. 08-02)
TOT-T	total load for period
MEAN-H	historical mean load
MEAN-S	standard period mean load
ERROR-S	standard error of mean %

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